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ALKALI METALS BOILING AND CONDENSING INVESTIGATIONS

Quarterly Progress Report 9

Edited by

F. E. TIPPETS

and

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MISSILE AND SPACE DIVISION

GENERAL ELECTRIC

CINCINNATI, OHIO 45215

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QUARTERLY PROGRESS REPORT 9

Covering the Period
June 30, 1964 through September 30, 1964

Edited by

F. E. Tippets
and
G. L. Converse

prepared for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Contract NAS 3-2528

October 20, 1964

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Nuclear Power Technology Branch
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SPACE POWER AND PROPULSION SECTION
MISSILE AND SPACE DIVISION
GENERAL ELECTRIC COMPANY
CINCINNATI, OHIO 45215

FOREWORD

Principal technical contribution to the program, within the General Electric Company, during the Quarter was by the following individuals.

Manager, Heat Transfer Program	F. E. Tippets
300 KW Loop Project	J. R. Peterson D. R. Ferguson
100 KW Loop Project	J. A. Bond
50 KW Loop Project	S. G. Sawochka
Pool Boiling Heat Transfer Investigation	C. F. Bonilla
Heat Transfer Equipment Design	R. R. Oliver R. S. Stankiewicz
Facilities	J. C. Amos R. A. Fuller
Instrumentation	W. H. Bennethum
Materials Support	W. R. Young W. H. Kerns
Analysis	G. L. Converse
Report Preparation	G. L. Converse

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NOMENCLATURE

Simple Latin Letter Symbols

Symbol	Quantity	Units
A, B	Constants	Dimensionless
A	When subscripted, A refers to an area	ft^2
a	Orifice cross sectional area	ft^2
C	Specific heat	$Btu/lb_m \, ^oF$
D	Diameter	ft
f	Darcy-Weisbach friction factor	Dimensionless
G	Mass velocity (flow rate per unit flow area)	$lb_m/hr\text{-}ft^2$
g	Acceleration due to gravity	$4.17 \times 10^8 \; ft/hr^2$
h	Heat transfer coefficient	$Btu/hr\text{-}ft^2 \, ^oF$
J	Conversion factor (mechanical equivalent of heat)	$778 \; ft\text{-}lb_f/Btu$
K	Slip ratio ($K = V_g/V_f$)	Dimensionless
k	Thermal conductivity	$Btu/hr\text{-}ft \, ^oF$
l	Length	ft
P	Pressure	lb_f/ft^2
Q	Rate of heat transfer	Btu/hr
R	Thermal resistance	$Hr\text{-}ft^2 \, ^oF/Btu$

Nomenclature (Continued)

Simple Latin Letter Symbols (Continued)

Symbol	Quantity	Units
T	Temperature	^{o}F
U	Overall heat transfer coefficient	Btu/hr-ft^2 ^{o}F
V	Velocity	ft/hr
W	Flow rate	lb_f/hr
x	Flowing quality	Dimensionless

Composite Latin Letter Symbols

Symbol	Quantity	Units
D_P	Condenser diameter (50 KW facility)	ft
L_P	Distance between the end of the inlet thermocouple probe and the beginning of the condenser (50 KW Facility)	ft
N_{Pe}	Peclet Number	Dimensionless
N_{Re}	Reynolds Number	Dimensionless
g_o	Conversion factor	4.17×10^8 $\frac{\text{ft-lbm}}{\text{lbf-hr}^2}$
P/D	Pitch to Diameter Ratio	Dimensionless
R_f	Liquid fraction $R_f = A_{f/A}$	Dimensionless
R_g	Void fraction $R_g = A_{g/A}$	Dimensionless

Simple Greek Letter Symbols

Symbol	Quantity	Units
β	Flow Coefficient	Dimensionless
ρ	Density	lb_m/ft^3
μ	Dynamic viscosity	lb_m/hr-ft
ν	Kinematic viscosity	ft^2/hr
ϕ	$\Delta P_{TPF}/\Delta P_O$	Dimensionless
Γ	Mass flow rate of liquid per unit circumference $\Gamma = \frac{(1-x)W}{\pi D}$	lb_m/hr-ft

Nomenclature (Continued)

Simple Greek Letter Symbols (Continued)

Symbol	Quantity	Units
θ	Angle of pipe axis with the horizontal	Radians
τ	Shear Stress	lb_f/ft^2

Subscripts

Symbol	Quantity
B	Boiling
C	Corrected or condensing
eq	Equivalent (for example $D_{eq} = \frac{4 \times \text{Cross Sectional Area}}{\text{Wetted Perimeter}}$)
f	Refers to liquid phase
g	Refers to vapor phase
I	Inlet
i	Inside or inlet
K	Potassium
KW	Potassium and Wall
L	Liquid
1	Refers to the station at the condenser exit (50 KW facility)
Na	Sodium
O	Outside, outlet
OB	Overall Boiling
OL	Overall liquid-liquid
TPF	Two-phase friction
Si	Refers to the inside diameter of an annular shell
Sat	Saturated state
W	Wall

Nomenclature (Continued)

Special Symbols

Symbol	Description
$\bar{\ }$	Indicates an average value
$\hat{\ }$	Indicates a weighted average

I. SUMMARY

F. E. Tippets

This program is being conducted for the National Aeronautics and Space Administration under Contract NAS 3-2528 to obtain two-phase heat transfer and fluid flow data for potassium under conditions of boiling and condensing approximating those anticipated in large space turbo-electric power systems. Test equipment development, materials studies and theoretical analysis related to the experimental work are conducted as a support effort. The following items summarize the work performed during the quarter ending September 30, 1964.

300 KW Project

Testing in the 300 KW loop at boiling potassium temperatures up to 1700°F with helical inserts of both 2-inch pitch and 5.5-inch pitch in a 1-inch nominal diameter tube was completed this quarter. All of the data taken with the 2-inch pitch insert, comprised of 18 liquid-liquid runs and 92 boiling runs, are reported herein. The data obtained with the 5.5-inch pitch insert, comprised of approximately 65 boiling runs and 10 liquid-liquid runs, are being reduced and will be reported during the next quarter. The data obtained show the helical insert to be very effective in extending the nucleate boiling regime to high qualities and thus increasing heat transfer performance. For several of the runs superheated vapor conditions were obtained at the test section exit.

The next series of tests will be with a 3/4-inch nominal diameter tube containing a helical insert of 4-inch pitch. The new test boiler for these tests has been assembled and installed in the loop and test operation should begin early in October.

<u>100 KW Project</u>

Modification of the 100 KW loop, to increase the range and control of experimental variables, was completed and shake down operation started in mid-August. Further development work on the radiant heater for the preboiler resulted in a coiled tungsten wire element design, which is now in use replacing the original tantalum sheet heater. In addition, a preheater has been installed upstream of the throttling orifice to permit controlled flashing of the fluid at the orifice in order to thereby extend the range of stable operation.

A total of 23 stable boiling heat transfer data points were obtained during the shake down period this quarter, using a 3/4-inch nominal diameter tube and covering a range of temperatures up to about 1830°F and vapor qualities up to about 50%. These data are reported herein, together with various calibration data for the loop and a few previously unreported liquid sodium heat transfer data points.

Testing with the 3/4-inch smooth tube will continue in the next quarter. Planned test conditions include temperatures up to 2100°F and vapor qualities up to about 90%.

50 KW Project

Following installation of a new helical induction pump, the 50 KW loop was operated briefly in July with the originally installed slotted and brazed test section. Recurrent plugging problems in the potassium loop necessitated shutdown, during which a number of modifications were made to improve the loop operability and a new test section was installed.

Subsequent operation near the end of the quarter resulted in completion of planned tests with the 5/8-inch ID smooth tube test section. A total of approximately 75 condensing data points were obtained in this geometry with saturated vapor at the test section inlet for temperatures up to 1450°F. The portion of these data taken early in the quarter are presented herein. The balance of the data, taken in September, are being reduced and will be reported during the next quarter.

A twisted ribbon insert has been installed in the 5/8-inch ID test section for the next series of tests, which should begin early in October.

Facilities, Instrumentation and Materials Support

Accountings of supporting work conducted throughout the quarter in the areas of facilities maintenance and repair, instrumentation, and materials are given in Sections V, VI and VII, respectively.

Analysis

The feasibility of determining local static pressure in two-phase potassium flow by use of thermocouples in conjunction with published saturation pressure-temperature data was investigated using data from the 300 KW facility. As is shown in Section VIII, the method apparently gives good accuracy.

Pool Boiling Investigation

Development of a leak in the pool boiling test apparatus prevented experimental work this quarter.

II. 300 KW PROJECT

J. R. Peterson/D. R. Ferguson

The 300 KW facility is used to obtain potassium boiling and condensing heat transfer data. Both the boiling and condensing test sections are controlled temperature types, i.e., the temperatures of the heat transfer fluids rather than heat flux are controlled. Reference 1 presents a detailed description of the facility.

Both liquid-liquid and boiling data were obtained during this reporting period with the 1.0-inch nominal diameter L-605 boiler tube containing 2.0-inch and 5.5-inch pitch helical inserts. All of the data obtained with the 2.0-inch pitch insert are reported herein. Eighteen liquid-liquid and 92 boiling runs are reported. Approximately 65 boiling and 10 liquid-liquid runs were obtained with the 5.5-inch pitch insert during this reporting period. These data are being reduced and will be reported later. Five hundred and seventy-seven hours of loop operation were accumulated this quarter, including 398 hours in boiling. The total loop operating time to date is 3424 hours.

Status of Loop and Test Section

Testing with the 2-inch pitch helical insert was terminated July 2, 1964 after the test plan presented in Reference 2 was satisfactorily completed. A new helical insert, having a pitch of 5.5-inches was installed in the boiler tube following completion of 2-inch pitch testing. Boiling operation with the new insert commenced July 23, 1964 after delays during start-up due to failures of both the dump tank and throttling valve bellows. After completion of planned boiling runs at 1700°F and 1550°F, an attempt was made to obtain additional data at 1400°F. This low temperature boiling operation was placed at the end of the 5.5-inch pitch test program because of the increased risk of test section failure, due to the reduced ductility of L-605 at 1400°F and the higher thermal stresses resulting from the increased temperature difference between the primary and secondary fluids. Testing was terminated by a boiler bellows failure as the 1400°F tests were started. The failure is discussed in more detail in Section V of this report.

Assembly of the next specified single tube test boiler, a 0.75-inch OD L-605 boiler tube containing a 4-inch pitch (P/D = 6) helical insert, is completed and the unit is installed in the facility. Test operation with this boiler is expected to commence early in October after the flushing operations necessitated by the boiler bellows failure are completed.

Two modifications have been incorporated into the facility in order to increase the control of test operation and to decrease the thermal stresses on the boiler bellows. Approximately 8 KW of electrical preheat has been installed in the potassium loop. This preheat will provide some control of the inlet subcooling and will be used under severe operating conditions to minimize subcooling and thereby reduce temperature gradients and thermal stress in the bellows region of the boiler inlet. In addition, the throttling valve at the potassium boiler inlet has been modified to provide better flow control, as described in Section V. This valve as modified can be used to load the potassium pump, thereby heating the potassium with the pump before entering the boiler and additionally reducing subcooling. These modifications will be especially useful in the planned co-current flow tests, which will place greater thermal stresses on the boiler bellows at the boiler inlet.

The maximum heat transfer capability of the new test section has been reduced due to the smaller tube diameter. The new test section choking and heat transfer limitations have been calculated and are shown in Figure 1, where the 3/4-inch and 1-inch test section limitations are compared. As indicated on the plot, the maximum attainable power has been reduced from 220 KW to 145 KW at 1500°F potassium exit temperature by the change of boiler tube diameter. It is emphasized that Figure 1 shows the potential or maximum capabilities since the potassium heat transfer resistance has been neglected.

Status of Data Reduction

Boiling data obtained during the period 5/19/64 through 7/2/64 with the 0.92-inch ID, 0.039-inch wall, L-605 boiler tube containing the 2-inch pitch helical insert are presented in Table A-2 of Appendix A. The nomenclature for the data tabulation is given in Table A-1 of Appendix A. The data presented cover the following range of variables:

Sodium flow rate, lb/sec	2.66	-	7.12
Sodium inlet temperature, ^{o}F	1225	-	1850
Potassium flow rate, lb/sec	0.063	-	0.690
Potassium exit temperature, ^{o}F	1124	-	1762
Potassium inlet sub-cooling, ^{o}F	92	-	441
Potassium exit quality, %	2.1	-	129*
Heat transferred, Btu/sec	11.5	-	123.4

The calculation procedures utilized in the data reduction are summarized in Appendix B.

Status of Data Evaluation

High Performance with the Helical Insert. The boiling data obtained with the 2-inch pitch helical insert show it to be very effective in extending the nucleate boiling region to high qualities. Several data points, in fact, were obtained which showed superheated vapor at the exit of the boiler tube.

Figures 2 through 5 show the sodium and potassium temperature profiles, as determined from the boiler shell and insert thermocouples, for a set of four runs in which the exit quality calculated by heat balance increases sequentially from nominally 100% to about 120%. The sharp rise in potassium temperature near the boiler exit in Figure 3, 4 and 5 shows that superheated vapor was obtained in these runs. The drop in temperature from the last insert thermocouple to

*Qualities greater than 100% indicate superheated vapor.

the potassium exit well thermocouples in Figure 5 is due to heat loss from the boiler hanger. The relatively small heat loss results in significant temperature changes in superheated vapor, due to its small heat capacity.

The sodium temperature profile shown for the 100% quality run (Figure 2) shows no abrupt change in slope, indicating that the entire tube is in nucleate boiling. As vapor superheat is produced, however, a break in the sodium profile appears, marking the point of change from the nucleate boiling region to the transition boiling and vapor superheat region. The break is seen to move progressively towards the potassium inlet in Figures 3 through 5 as the amount of vapor superheat is increased. The break in sodium profile does not occur at the same axial position as the point in the potassium profile indicating the beginning of vapor superheat, thus the change from nucleate to transition boiling occurs at slightly less than 100% quality.

Figure 6 shows the superheated vapor points obtained with the 2-inch pitch insert plotted on pressure-temperature co-ordinates. The points falling off the saturation line in the superheated vapor region are runs for which the calculated quality is in excess of 100%. Also plotted are those data with exit qualities from 10% to 90%, which fall on the saturation curve as expected. The pressure plotted was obtained from the boiler exit pressure gage and the temperature from the insert thermocouple at the potassium exit end of the boiler tube. The measured saturation points agree very well with the line drawn, which is obtained from the recent data of the Naval Research Laboratories (Ref. 3).

Liquid Sodium Heat Transfer Coefficient. As discussed in Reference 4, values of the sodium heat transfer coefficient for the shell-side of the 300 KW test section are necessary in order to calculate boiling potassium heat transfer coefficients from the overall coefficients obtained from the measured data.

Lyon (Ref. 5) recommends the following equation for the prediction of liquid metal heat transfer coefficients in the annulus or shell side of tubular heat exchangers for ratios of shell ID to tube OD $(\frac{D_{si}}{D_o})$ greater than 1.4.

$$h_{Na} = A \left(\frac{D_{si}}{D_o}\right)^{0.3} (k/D_{eq}) \left[B + 0.025 \, (N_{Pe})^{0.8} \right] \qquad (1)$$

The recommended value of A in the above equation is 0.75. The value of B is 7 for constant heat flux and 5 for constant wall temperature.

The value of A for the 300 KW test section is expected to deviate somewhat from the value recommended by Lyon, since the experimental geometry is not that of an ideal tubular heat exchanger, due to the presence of centering pins in the annulus and the effect of sodium inlet and exit geometry. Furthermore, the proper value of B is not obvious. A two fluid heat exchanger is neither constant heat flux or constant wall temperature, although probably closer to the latter.

Due to these uncertainties an analytical procedure was developed and special liquid-liquid runs were obtained in the 300 KW test section for an attempt to determine the values of A and B experimentally.

The experiment performed consisted of measuring the overall liquid-liquid heat transfer coefficient (U_{oL}) as the sodium mass flow rate was varied, while the potassium flow rate was held constant. The experiment was carried out at approximately constant temperature.

The data obtained at 2100 hours on 5/12/64 through 1230 hours on 5/13/64, tabulated in Table A-3 of Appendix A,are the experimental points obtained under these conditions. The overall liquid-liquid heat transfer coefficient (U_{oL}) is calculated from the experimental data as follows, where T_{Ki}, T_{Ko}, T_{Nai} and T_{Nao} are the average potassium and sodium boiler inlet and outlet temperatures respectively, as given by Table A-3 of Appendix A.

$$U_{oL} = \frac{Q_K}{\overline{\Delta T}\ A_B} \qquad (2)$$

where

$$Q_K = W_K C_K\ (T_{Ko} - T_{Ki}) \qquad (3)$$

$$\overline{\Delta T} = \frac{(T_{Nai} - T_{Ko}) - (T_{Nao} - T_{Kin})}{\log_e \dfrac{T_{Nai} - T_{Ko}}{T_{Nao} - T_{Ki}}} \qquad (4)$$

The total heat transfer area based upon the boiler tube ID (A_B) for the data treated is 1.840 ft^2. The overall liquid-liquid heat transfer coefficients calculated in this manner are shown in Figure 7, plotted versus the sodium Peclet number. Table C-2 of Appendix C lists the computed values.

The data points at the two highest sodium Peclet numbers are not given much weight in drawing the smooth line shown. The value of $T_{Nai} - T_{Ko}$ for these points is less than $5^{o}F$, which could introduce considerable error in U_{oL}, since the error in temperature difference measurements in the 300 KW facility is approximately $1^{o}F$.

Liquid-metal heat transfer coefficients are functions only of the Peclet number, which is a function only of flow rate and temperature. Under the conditions of the experiment, therefore, the potassium and tube wall heat transfer coefficients (h_{KL} and h_W respectively) are constant, and only the sodium heat transfer coefficient varies. Equation (5), following, can therefore be written for the overall coefficient U_{oL}, where R_{KW} is a constant.

$$\frac{1}{U_{oL}} = \frac{1}{h_{Na}\left(\frac{D_o}{D_i}\right)} + \frac{1}{h_W} + \frac{1}{h_{KL}} = \frac{1}{h_{Na}\left(\frac{D_o}{D_i}\right)} + R_{KW} \qquad (5)$$

Assuming h_{Na} is given by Equation (1), the following relation is obtained from Equation (5).

$$\frac{1}{U_{oL}} = \frac{D_{eq}/k}{A\left(\frac{D_{si}}{D_o}\right)^{0.3}\left[B + .025\,(N_{Pe})^{0.8}\right]\left(\frac{D_o}{D_i}\right)} + R_{KW} \qquad (6)$$

From the smooth curve of Figure 7, overall coefficients U_{oL_1} and U_{oL_2} can be obtained at sodium Peclet numbers N_{Pe_1} and N_{Pe_2}. Using Equation (6) above, the constant A can be determined as follows:

$$\frac{1}{U_{oL_1}} - \frac{1}{U_{oL_2}} = \frac{Deg/k}{A\left(\frac{D_{si}}{D_o}\right)^{0.3}\left(\frac{D_o}{D_i}\right)}\left[\left(\frac{1}{B+.025(N_{Pe_1})^{0.8}}\right)-\left(\frac{1}{B+.025(N_{Pe_2})^{0.8}}\right)\right] \qquad (7)$$

The constant A was obtained from Equation (7) above for both values of B under consideration (B = 5 and B = 7). Values of U_{oL_1} = 1226 and U_{oL_2} = 1608 at N_{Pe1} = 100 and N_{Pe_2} = 1000 were obtained from Figure 7.

The resulting equations for h_{Na} are given below:

$$h_{Na} = 0.6744 \left(\frac{D_{si}}{D_o}\right)^{0.3} \left[5 + 0.025 \left(N_{Pe}\right)^{0.8}\right] \qquad (8)$$

$$h_{Na} = 0.4295 \left(\frac{D_{si}}{D_o}\right)^{0.3} \left[7 + 0.025 \left(N_{Pe}\right)^{0.8}\right] \qquad (9)$$

The procedures followed forced Equation (1) to fit the experimental data at two values of the sodium Peclet number. The best value of B is the value which best fits the experimental data, that is, which gives the least standard deviation in the theoretically constant R_{KW}. The values of R_{KW} for both values of B were computed from the individual data points using Equations (8), (9) and (6) and are listed in Table C-2 of Appendix C. The resulting percent standard deviation in R_{KW} for B = 5 is 2.2%, whereas a standard deviation of 2.9% was obtained for B = 7. The data at the two highest sodium Peclet numbers were omitted as before. Equation (8) is therefore recommended for the computation of the sodium heat transfer coefficient in the 300 KW test section.

Using the average value of R_{KW} determined from the B = 5 results and Equation (5), experimental values of h_{Na} can be computed from the experimental values of U_{oL}. The points so obtained are plotted in Figure 8 and compared with the recommended equation and with Lyon's prediction. The data fall below Lyon's prediction, but are in good agreement with the recommended Equation (8).

Boiling Potassium Pressure Drop. The forced convection boiling potassium pressure drop results obtained from the 2-inch pitch insert data are shown in Figures 9 and 10, where the experimental two-phase multipliers are plotted versus exit quality. Also shown are the Martinelli and homogeneous model predictions, obtained from Reference 4, Figures 19 and 20.

The values plotted are listed in Table 7. The experimental pressure drops are obtained from the boiler inlet and outlet pressure gages, corrections for liquid potassium head and momentum pressure drop being applied. The estimated accuracy of the pressure gages utilized is $\pm$ 0.5 psi. The values of potassium liquid pressure drop necessary to calculate the two-phase multipliers were obtained analytically from measured water pressure drop data as discussed in Reference 4. A more detailed discussion of the data evaluation procedure is given in Appendix D of this report.

As can be seen from the figures, the experimental multipliers agree well with the homogeneous model prediction, falling somewhat lower than the Martinelli prediction. Neither prediction is valid above 100% exit quality, thus the experimental points obtained above 100% exit quality should not be compared with theory.

The experimental frictional pressure drop multipliers are expected to be somewhat low. The proper slip ratio to employ in the momentum pressure drop correction is not known at this time. A slip ratio of 1.0 was used, which is thought to give the highest value to the momentum pressure drop.

As can be seen from Table C-4 of Appendix C, the momentum correction is approximately 20% of the total pressure drop, thus the corrected values could be low by this amount.

<u>Boiling Potassium Heat Transfer Coefficients</u>. Overall boiling heat transfer coefficients have been calculated from the two-inch pitch insert boiling data. The values are listed in Table C-4 of Appendix C and the calculational procedure is given in Appendix D.

Average boiling potassium heat transfer coefficients (h_K) are obtained from the overall boiling coefficients (U_{oB}) as follows, where h_{Na} is the sodium coefficient as obtained from Equation (8) and k_w is the thermal conductivity of the boiler tube.

$$\frac{1}{h_K} = \frac{1}{U_{OB}} - \frac{1}{h_{Na}\left(\frac{D_o}{D_i}\right)} - \frac{D_i \log_e\left(\frac{D_o}{D_i}\right)}{2\ k_w} \qquad (10)$$

Using resistance symbols for the three terms on the right side of Equation (10) above, it can be written as follows:

$$\frac{1}{h_K} = R_{OB} - R_{Na} - R_w \qquad (11)$$

The procedure is illustrated in Figures 11 and 12, where the experimental values of R_{OB} are plotted versus exit quality for the two temperatures of operation. The values of R_{Na} and R_w, which were held essentially constant during the experiments, are also shown.

The values of the average boiling heat transfer coefficient h_K obtained from the experimental values of U_{OB} and equation (10) are plotted in Figures 13 and 14. As can be seen from the Figures, the effect of potassium mass velocity is small. The heat transfer coefficient apparently increases with increasing boiling pressure, however, as the majority of the values presented in Figure 13 ($1700^{\circ}F$ boiling temperature) are higher than those presented in Figure 14 ($1550^{\circ}F$ boiling temperature). This same trend of boiling heat transfer coefficient with pressure was observed in the no-insert data presented in Reference 4. The scatter in the boiling potassium resistance becomes large for small resistances (or large heat transfer coefficients) due to the reduced accuracy in the difference between two large numbers as the difference becomes small (equation 11). Assuming only 5% scatter in a measured U_{OB} of 2000 and furthermore assuming 5% uncertainty in (R_{Na} + R_W), the uncertainty in h_K rises from 15% to 67% as h_K increases from 5,000 to 20,000.

The best manner of determining the average boiling temperature difference, which is used in the calculation of U_{OB} as described in Appendix D has not yet been established. U_{OB} and h_K have been calculated for both the arithmetic and logarithmic average boiling temperature difference. The values calculated for both averages are presented in Table C-4 of Appendix C; only the values based on the arithmetic average, however, are plotted.

Test Planning

A boiling test plan for the 3/4-inch OD boiler tube containing a 4-inch pitch (P/D = 6) helical insert is presented following. The data obtained with the 1.0-inch OD tube containing 2.0 and 5.5-inch pitch inserts have shown that the potassium flow rate has a minor effect on both the heat transfer and pressure drop results (e.g., see Figures 9, 10, 13 and 14. For this reason, items 1 and 2 of the test plan provide that the potassium exit quality will be varied for only one potassium flow-rate at the two boiling temperatures specified.

Additional data points, as specified by items 3 and 4 of the plan, will be obtained to determine under which conditions the transition from nucleate to film boiling occurs with the new test section.

300 KW BOILING TEST PLAN

(3/4-inch OD Tube with 4-inch Pitch Insert)

Item	Sodium Flowrate lb/sec.	Potassium Flowrate lb/sec.	Potassium Exit Temp. °F	Exit Quality %	Approx. No. of Data
1	5	0.1	1700	0-75 >75	5 5
2	5	0.1	1550	0-75 >75	5 5
3	1-6	0.1	1550	90	7
4	2	0.05-0.15	1550	80	15

III. 100 KW PROJECT

J. A. Bond

The 100 KW facility is a single loop system used to study heat transfer to boiling alkali metals at temperatures up to 2200°F. The radiant heated boiling test section is a vertical section of 3/4-inch, schedule 80, Cb-1%Zr pipe. Thermocouples are attached along the outer wall of the test section at intervals of approximately 3-inches. A preboiler, located upstream of and in series with the test section, controls the quality of the fluid entering the test section. The working fluid is potassium.

Status of Loop and Test Section

Modification of the 100 KW loop, as described in Reference 2 was completed and shakedown operation was started during the third week of August. As outlined in Reference 2, the main objective of this modification was to increase the range and control of test variables that can be accomplished. In particular, by control of the power in the new preboiler independent of the test section power, as provided by the modification, quality at the test section exit and test section heat flux can be varied independently of each other. Thus, for example, tests can be made at constant flow and saturation temperature for various constant heat fluxes over a range of qualities up to approximately 100%, or as limited by onset of the critical heat flux condition (film boiling).

The loop modification included the following major changes:

1. The previously employed dump tank has been replaced by a new tank along with associated piping, and an isolation valve between the dump tank and loop was added.

2. The Cb-1%Zr piping between the E. M. pump discharge and the condenser inlet has been removed and replaced with a new piping system including a preboiler coil upstream of the new test section.

Further details of the loop modification are contained in Section V of this report.

Before start-up of the loop, tests were performed to determine the heat loss from the preboiler and test section radiation shield cases. The results of these tests are presented in Figures 15 and 16.

Several shutdowns were required since the loop was placed in operation due to: 1) electrical shorts in the test section heater element; 2) erratic flow signals, and 3) failures of the preboiler heater element. The electrical short problem was eliminated by grinding away a portion of the upper tungsten electrode plates to prevent touching. The flow signal problem was found to be due to defective joints between the Cb-1%Zr flowmeter wires and the copper leadout wires. The defective joints were cut out and replaced.

The principal cause of loop shutdown has been due to failures of the preboiler heater element. Two tantalum sheet heaters have failed. Although the effective average temperature of these heaters never exceeded 3300°F, the failures were apparently caused by local overheating of the tantalum near the bottom of the heater. A new heater was then fabricated from 0.006-inch tungsten sheet. Failure of this heater was caused by a sudden surge of power which broke the brittle tungsten. A new tungsten heater has been fabricated from coiled tungsten wire. Due to the flexibility of the coils, this heater will not be as fragile as the tungsten sheet design and should have long life.

A total of 23 stable boiling points were obtained during the intial shakedown runs, increasing the hours of operation from 3814 to 3935. The stability characteristics of the modified loop appear to be about the same as before modification, based on limited operation since modification.

Status of Data Reduction

A new computer program, written to reduce the data from the modified facility, has been checked out and all boiling data taken during the present reporting period have been reduced.

Status of Data Evaluation

Heat Loss Tests. The new preboiler and the test section are insulated with radiation shields consisting of five concentric tantalum sheets enclosed in stainless steel cases. The purpose of the heat loss tests was to determine the relationship between the heat loss and temperature of the outer surface of the radiation cases. These tests were conducted while the loop piping was removed. Each radiation case, enclosing its heater, was mounted in its normal position within the vacuum chamber. With the vacuum chamber evacuated, power was supplied to the heaters and the corresponding steady state radiation shield case temperatures were measured. This procedure was repeated at several power levels and since all the power supplied was lost through the shields, a direct correlation of heat loss as a function of temperature was obtained.

The temperature of each case was measured at six locations. The temperature used in the heat loss correlations is a weighted average, $\hat{T}$, of the six measured values:

$$\hat{T}\ (^{o}F) = \left(\frac{\Sigma_1^6\ T_i^{\ 4}}{6} \right)^{\frac{1}{4}} -460 \qquad (1)$$

where the T_i are the six measured temperatures in degrees Rankine. The results of the preboiler heat loss test are presented in Figure 15 and Figure 16 shows the results of the test section heat loss calibration.

Orifice Calibration Tests. An orifice (0.067-inch hole), located at the inlet of the preboiler, increases the liquid phase pressure drop and serves to promote system stability. Pressure taps are located upstream and downstream of the orificc. A Taylor absolute pressure transducer is currently on order. This will be installed at the upstream tap for use in conjunction with measurements of downstream pressure by thermocouples in the boiling region (saturation pressure) to enable a check on the E. M. flowmeter to be made, based on the orifice pressure drop.

In order to use the orifice as a flow metering device, its pressure drop flow characteristics must be known. Water pressure drop tests as a function of flow rate have been conducted to determine this characteristic for the 100 KW loop orifice. The actual loop piping and orifice were simulated in a water test rig. The water pressure drop across the orifice was measured with a mercury manometer and the liquid flow rate determined by the weight of water flowing for a measured time. The results of these tests are presented in Figures 17 and 18. Figure 17 is a plot of the measured pressure drop as a function of water flow rate. These data are replotted in Figure 18 with the orifice flow coefficient as a function of Reynolds number. The flow coefficient, β, is defined by Reference 6:

$$\beta = \frac{W}{a\sqrt{2g_o\rho(\Delta P)}} \qquad (2)$$

where,

W = Flow rate, lb_m/sec

a = Orifice cross sectional area, ft^2

$$g_o = \text{Constant} = 32.2 \frac{lb_m\text{-}ft}{lb_f\text{-}sec^2}$$

ρ = Fluid density, lb_m/ft^3

ΔP = Orifice pressure drop, lb_f/ft^2

Boiling Potassium Data. The results of initial boiling tests performed in the modified loop during shakedown operation are tabulated in Appendix E, Table E-1. An instrumentation list (showing test section thermocouple locations) along with a table key preceeds the tabulated data. The ranges of variables covered in these tests are:

Test Section Heat Flux, $Btu/hr\text{-}ft^2$	29,300	to	57,100
Test Section Inlet Quality, %	0	to	36
Test Section Outlet Quality, %	14	to	51
Test Section Exit Temperature, ^oF	1749	to	1827
Mass Velocity, $lb_m/hr\text{-}ft^2$	41,400	to	46,100

The test procedure used for these data was to hold the flow rate, pressure and heat flux constant while the test section inlet quality was increased by increasing the power to the preboiler. Testing was limited by mechanical failures, described above, and by onset of system instability at the higher vapor qualities, as manifested by flow, temperature and dump tank level oscillations. Subsequent to these tests a preheater was installed upstream of the orifice (see Section V) for the purpose of extending the range of stable operation by the method of inducing flashing at the orifice discharge.

Figure 19 is a plot of the local heat transfer coefficient at the test section outlet as a function of test section exit quality. The flow rate and pressure are constant for these data. Two test section heat fluxes are included. There appears to be a heat flux effect over the limited range of data taken. Use of the preboiler to control the test section inlet quality independent of the test section heat flux allows one to separate the effects of heat flux and quality as described in Reference 2. Further testing over wider ranges of variables should reveal these effects.

<u>Liquid Sodium Data</u>. In Reference 1, seven liquid sodium points, taken during initial operation of the 100 KW loop, were presented in graphical form. This data is tabulated in Appendix E, Table E-2.

<u>Test Planning</u>.

The plan for initial boiling runs in the 100 KW loop with the currently installed 3/4-inch smooth tube test section without insert is presented in Table 1. The flow rate and test section outlet temperature will be held constant. A test section heat flux will be set and preboiler power increased to vary test section exit quality up to near 100% or until the critical heat flux is reached in either the preboiler or the test section. This procedure will be repeated for different test section heat fluxes and then again for different flow rates and outlet temperatures, grouped as indicated in Table 1.

IV. 50 KW PROJECT

S. G. Sawochka

Status of Loop and Test Section

During this quarter a substantial amount of modification has been made to the facility. A review of these modifications is presented in Section V of this report. After installation of the new helical induction pump in the potassium loop early in July, some condensing operation was obtained between July 21 and July 24. The test section installed in the facility at that time was the slotted and brazed 5/8-inch ID section with four wall thermocouples at each of two locations functioning. Thirty-four condensing data points were obtained with this test section. Recurrent plugging problems in the potassium loop required that the facility be shut down on July 24, at which time the facility modifications intended to eliminate plugging problems and to improve loop operating characteristics were begun as discussed in Section V of this report. The modifications were completed and the new 5/8-inch ID test section with 5 drilled 0.050-inch ID, 9-inch long thermocouple holes at each end was installed in early September. Approximately 41 condensing data points were obtained with the new 5/8-inch tube test section without insert between September 13 and 15 at boiler powers up to 30 KW and potassium vapor temperatures up to 1450°F. Following completion of this series of tests the facility was shut down and a twisted ribbon insert of pitch/diameter ratio = 6 was installed in the test section. Testing with this insert is expected to begin early in October.

Status of Data Reduction

The condensing data that were obtained in July, 1964 were reduced using the calculational procedures of Reference 7. In addition, a correction was applied to the inlet vapor temperature to provide for the pressure drop prior to the beginning of the condensing length. This correction is discussed below. The results are presented in Table F-2 of Appendix F. The previously reported data have also been corrected for pressure drop prior to the test section active length, and the results are presented in Tables F-4 and F-6 of Appendix F. All of the data, corrected on this basis, are presented in Figures 20 and 21. Additional data, taken in September, are in the process of being reduced and will be reported in the next Quarterly Progress Report.

The condensing data that are presented in this report encompass the following range of variables:

Potassium flowrate, lbs/sec	.003	to	.013
Sodium flowrate, lbs/sec	.502	to	1.29
Potassium condenser inlet temp, ^{o}F	1130	to	1312
Potassium condensing heat transfer coefficient, Btu/hr-ft^2 ^{o}F	6600	to	22,400
Condensing heat flux, Btu/hr-ft^2	1.7	to	9.5(10^4)
Quality range, %	25	to	87
L/D range	13	to	46
Nusselt condensing ratio $\frac{h}{k}\left(\frac{\nu^2}{g}\right)^{1/3}$	.0185	to	.0625
Film Reynolds number, $\frac{4\Gamma}{\mu}$	220	to	2500
Net Power, KW	2.7	to	11.5

Status of Data Evaluation

Determination of the Potassium Vapor Temperature at the Beginning of the Condensing Length. The assumption made in earlier data reductions that the measured inlet potassium vapor temperature gives an accurate value of the potassium temperature at the beginning of the condensing length was investigated and found to be a source of serious error in the calculation of the condensing heat transfer coefficient, due to the pressure drop between the inlet potassium temperature measuring probe and the beginning of the test section active length. The pressure drop, ΔP_I, between the end of the probe and the beginning of the condenser length can be calculated from Equation 1, which is applicable prior to the beginning of the test section active length since the saturated vapor can be treated as a single phase fluid.

$$\Delta P_I = \frac{fL_P}{D_P} \frac{G^2}{2g_o\rho_g} \qquad (1)$$

where f is given by Equation (2) and L_P/D_P is set by the distance of the probe, L_P, from the test section inlet and the diameter of the tube, D_P, preceeding the test section.

$$f = \frac{0.316}{\left(\frac{DG}{\mu}\right)_g^{0.25}} \qquad (2)$$

After determination of this pressure drop, the decrease of the potassium saturation temperature, ΔT_{KI}, between the probe and the beginning of the condensing length is determined from Equation (3).

$$\Delta T_{KI} = \Delta P_I \left(\frac{dT}{dP}\right)_{K_{sat}} \qquad (3)$$

The probe potassium inlet temperature was then corrected as shown in Equation (4).

$$T_{KIC} = T_{KI} - \Delta T_{KI} \qquad (4)$$

All of the condensing data that has been obtained to date was then re-evaluated using a corrected potassium inlet vapor temperature as discussed above, and the re-evaluated results are presented in Tables F-4 and F-6 of Appendix F and in Figures 20 and 21.

A result of this procedure, when applied to the condensing data of December, 1963, was the elimination of the initially indicated dependence of the condensing heat transfer coefficient on potassium vapor temperature at a constant liquid film Reynolds number. This dependence had lead to the postulation of a temperature dependent thermal resistance either at the liquid-vapor interface or within the vapor itself. This dependence on temperature is no longer indicated by the recalculated results. However, the possibility remains that there is a thermal resistance at the interface which is relatively independent of temperature level. As is discussed below, this additional thermal resistance, even if it is present, will be difficult to quantitatively determine with the present data due to the inaccuracy inherent in the calculation of the local potassium vapor temperature.

Analytical Determination of the Potassium Axial Temperature Distribution. In an effort to determine the possible error in the condensing heat transfer coefficient associated with the assumption of a linear potassium temperature profile along the condensing length, the axial pressure distribution was analytically determined for a slip ratio of unity and a slip ratio equal to $\sqrt{\rho_f/\rho_g}$. The potassium temperature was then assumed to correspond directly to the calculated saturation pressure distribution. It should be noted, however, that this method does not allow for the possibility of a non-equilibrium mixture of monomer, dimer, and trimer being present in the potassium stream. Allowance for this effect is not possible at this time.

The method used was based on an analytical prediction of the momentum and frictional components of the pressure drop, with the assumption of a linear axial quality variation. The final expression for the pressure drop associated with the partial condensation of saturated vapor to some arbitrary quality x is given by Equation 5. The derivation of Equation 5 is given in Appendix G, Part 1:

$$P_\ell - P_I = \frac{G^2}{\rho_f g_o} \left\{ \left[\frac{\rho_f}{\rho_g} - \frac{\rho_f}{\bar{\rho}} \right] - \phi_{1-x} \frac{f\ell}{2D} \right\} \tag{5}$$

where $$\frac{1}{\bar{\rho}} = \left[\frac{(1-x)K}{\rho_f} + \frac{x}{\rho_g} \right] \left[\frac{1}{K} + x - \frac{x}{K} \right] \tag{6}$$

The effect of density head on this relation has been neglected. In order to present graphically the results for the pressure distribution, Equation 5 was rearranged to give Equation 7 which is composed only of dimensionless groupings.

$$\frac{P_\ell - P_I}{G^2/\rho_f g_o} = \frac{\rho_f}{\rho_g} - \frac{\rho_f}{\bar{\rho}} - \phi_{1-x} \frac{f\ell}{2D} \tag{6}$$

The two-phase friction multiplier, ϕ_{1-x}, is given by Equation 8, as explained in Appendix G, Part 2:

$$\phi_{1-x} = \left\{ \frac{1}{1-x} \left(\frac{1}{\frac{\mu_f}{\mu_g} -1} \right)^2 \right\} \left\{ \left(\frac{\rho_f/\rho_g -1}{1.75} \right) \left(\left(^{\mu_f}/_{\mu_g} \right)^{1.75} - \left(1 + x\left(\frac{\mu_f}{\mu_g} -1 \right) \right)^{1.75} \right) \right.$$

$$\left. - \left(\frac{\rho_f/\rho_g - \mu_f/\mu_g}{0.75} \right) \left(\left(^{\mu_f}/_{\mu_g} \right)^{0.75} - \left(1 + x \left(\frac{\mu_f}{\mu_g} -1 \right) \right)^{0.75} \right) \right\} \tag{8}$$

Therefore, for any given condensing temperature and liquid Reynolds number, the total dimensionless condensing pressure drop is given by evaluating Equation (7) at the condenser exit, for which x = o and, from Equation (6), $\hat{\rho} = \rho_f$, which obtains Equation (9).

$$\frac{P_0 - P_I}{G^2/\rho_f g_o} = \frac{\rho_f}{\rho_g} -1 - \phi_{1-o} \frac{fL}{2D} \tag{9}$$

Consequently, for any given condensing temperature and liquid Reynolds number, the dimensionless axial pressure distribution for partial condensation to some arbitrary quality X is given by Equation 10.

$$\frac{P_1 - P_I}{P_0 - P_I} = \frac{\rho_f/\rho_g - \rho_f/\hat{\rho} - \phi_{1-x} \frac{fl}{2D}}{\rho_f/\rho_g -1 - \phi_{1-o} \frac{fL}{2D}} \tag{10}$$

Assuming as an idealization, for small changes in pressure, that the saturation temperature varies linearly with pressure, the relation of Equation 10 also may be rewritten in terms of potassium saturation temperature as shown in Equation 11.

$$\frac{P_1 - P_I}{P_O - P_I} = \frac{T_K - T_{KI}}{T_{KO} - T_{KI}} = \frac{\rho_f/\rho_g - \rho_f/\hat{\rho} - \phi_{1-x} \frac{fl}{2D}}{\rho_f/\rho_g - 1 - \phi_{1-o} \frac{fl}{2D}} \qquad (11)$$

Therefore, for constant values of the liquid Reynolds number and condensing temperature, a dimensionless temperature distribution can be obtained and compared to the linear distribution that has been assumed during the calculation procedures. The results are shown in Figure 22 and 23 for a liquid Reynolds number of 2,000 at temperatures of 1100 and 1500°F for a slip ratio of unity and for a slip ratio of $\sqrt{\rho_f/\rho_g}$. The same results are shown in Figures 24 and 25 for a liquid Reynolds number of 10,000. As can be seen from Figures 22 through 25, the potassium axial temperature distribution, although relatively independent of the liquid Reynolds number and saturation temperature, is a strong function of the slip occurring during the condensing process, and hence cannot be calculated with complete accuracy. However, an estimate of the possible error involved in the evaluation of the condensing heat transfer coefficient can be obtained by considering data run 1, as presented in Appendix F-4, using the three analagous potassium axial temperature distributions as shown in Figures 22 through 25, and evaluating the effect of this change of temperature profile on the condensing heat transfer coefficient calculated at the bottom position. This position affords a better comparison to analysis since a linear variation of quality with length is a more accurate assumption for the longer condensing length.

The results of this procedure are presented below:

Method of Obtaining T_{KB}:

Method	T_{KB}	h
1. Interpolation between inlet and outlet	1145	18,300
2. Use of P distribution with slip ratio = 1	1140.6	-187,000
3. Use of P distribution with slip ratio = $\sqrt{\rho_f/\rho_g}$	1145.7	15,900

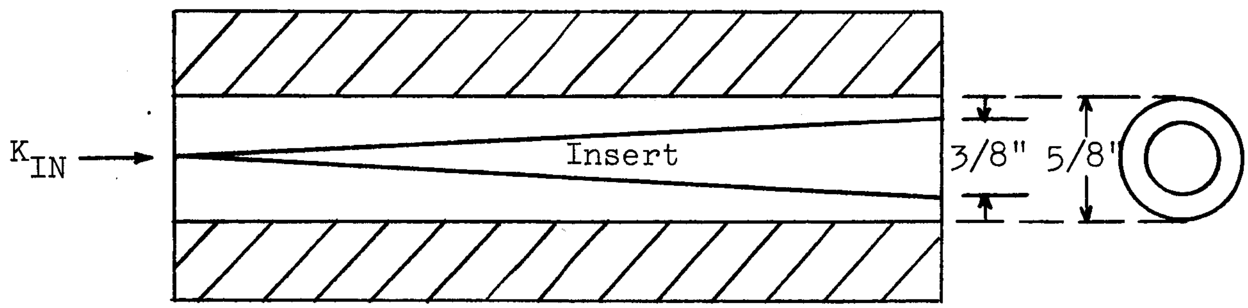
Examination of the wide variation of the condensing heat transfer coefficient as shown above with the assumption of various potassium axial temperature profiles makes it apparent that a serious source of error may be present in the estimation of the local potassium saturation temperature.

Test Planning

In the operation with the 5/8-inch ID tube with twisted ribbon insert, tests are planned to be run at condenser loads of 10, 15, 20, 25, and 30 KW and at inlet vapor temperatures of 1200, 1300, and 1450°F.

Current plans are to install a tapered solid insert in the 5/8-inch tube at the completion of the twisted ribbon tests. The tapered insert will form an annular passage for the potassium vapor that will decrease uniformly from the 5/8-inch ID tube flow area to that formed by the insertion of a 3/8-inch plug into the 5/8-inch

ID test section at its exit as pictured below. A similar test plan as that described above for the twisted ribbon insert will be followed with this tapered insert.



Tapered Insert

V. FACILITIES

J. C. Amos

300 KW Loop

This facility operated 577 hours during this quarter including 398 hours under boiling conditions, completing test runs with the 1-inch tube test boiler with 2-inch pitch and 5.5-inch pitch helical inserts. A boiler bellows failure occurred at the end of the 5.5-inch pitch test operation during 1400°F boiling runs. This L-605, 1-inch test boiler had operated a total of 1,423 hours including 632 hours of boiling operation, and the 300 KW loop has operated a total of 3,424 hours. Immediately following the boiler failure, assembly of a L-605, 3/4-inch tube test boiler with a 4-inch pitch insert was started using parts which had previously been machined for either a 1-inch tube back up boiler or a 3/4-inch tube new boiler. This boiler was welded into the loop early in September. Final instrumentation and insulation were installed and the loop was being hot flushed at the end of this quarter to remove the sodium from the potassium system resulting from the bellows leak. Measurements taken when removing the potassium from the dump tank indicated that approximately 130 lbs. more liquid metal was removed than had originally been transferred to the tank. Chemical analysis indicated that the potassium contained approximately 38%

sodium. Analysis of samples from the sodium system showed about 10 PPM potassium indicating that the leak was essentially all from the sodium side to the potassium side.

During installation of the new 3/4-inch tube test boiler approximately 8 KW of electrical preheat in the form of clam shell type heaters was added to the potassium inlet line to the boiler. This loop modification will minimize the thermal stresses imposed on the boiler bellows and extend the test operating range at low potassium flow conditions. During this down time a new plug, which has smaller by-pass flow parts, was installed in the potassium throttling valve. This higher flow resistance valve will allow operation of the potassium pump at higher head conditions thereby putting more energy into the liquid to further reduce liquid subcooling at the potassium inlet to the boiler. Figure 26 shows a 3/4-inch tube test boiler during assembly and Figure 27 shows the 300 KW test facility as presently arranged.

100 KW Loop

Modification of this facility as described in detail in Reference 2 were completed with the exception of the installation of the Taylor absolute pressure gage which has not been received from the vendor, and operation started during August. Heat loss calibrations of the preboiler and test boiler heat shields had previously been completed in July and initial loop operation included shake down and thermocouple calibration with liquid circulation. The loop operated a total of 121 hours during the quarter including 83 hours under boiling conditions. Since initial operation this loop has operated 3935 hours with liquid metal in the system.

During shake down operations minor interruptions were required to repair a short circuit in the test section heater and an open flow meter lead. A major difficulty was encountered with the preboiler radiant heater. The first heater utilizing 0.003-inch tantalum ribbons failed at 18 KW. A second heater of the same design was installed to allow continuation of testing while a heater constructed of 0.006-inch tungsten ribbons was designed and fabricated. The second tantalum heater also failed at approximately 18 KW. The new tungsten heater cracked during start up, possibly due to a power surge. A third heater design incorporating tungsten coils used successfully in earlier preheaters was designed, fabricated, installed and is being checked out.

In addition to the loop modifications previously described and shown in Figures 28, 29, 30 and 31, a preheater similar to the one used in earlier tests has been installed upstream of the orifice to extend the operating range of the loop. Present arrangement of the loop is shown in Figure 32.

50 KW Loop

Following installation of a new helical induction pump in the potassium system, thermocouple calibration runs were completed and approximately 50 condensing data runs recorded with the 5/8-inch nickel test section containing slotted and brazed thermocouple penetrations. Some plugging difficulties were encountered and during a hot flushing operation, a leak in the potassium boiler occurred at one of the immersion heater fittings in the boiler wall.

During the down time required to repair the boiler the following additional loop modifications were made.

1. The slotted 5/8-inch test section was replaced with the new drilled type test section. See Figures 33, 34, and 35.

2. A diffusion cold trap was added to the sodium system in the form of a cold leg installed between the sodium pump and the dump tank.

3. A by-pass hot trap containing approximately 4 lbs. of zirconium was installed in parallel with the test condenser. See Figure 36. This device will allow hot trapping during hot flushing operation, to remove any oxide formed in the loop.

4. Two types of artificial nucleation sites have been added to the pot boiler. These are:

   (a) Hot fingers, consisting of a 1-inch diameter stainless steel bar containing a 0.050-inch diameter hole and an independently controlled electrical heater, were installed at two locations on opposite sides of the boiler near the bottom.

   (b) Sleeves made of stainless steel 1-inch long and 0.062-inch thick, were installed on each of the four bottom row immersion heaters.

These sleeves will induce local hot spots on the heaters that should produce nucleation. However, the temperature is dependent on the power setting and cannot be independently controlled. They, therefore, may not be effective at low power settings.

Following these modifications, condensing data up to 30 KW boiler power and 1450^{o}F vapor temperature were obtained with the 5/8-inch drilled type test section during operation in September. The loop was then shut down, a twisted ribbon insert was installed in the test condenser and new test section thermocouples were installed for the next series of runs. A 3/8-inch ID nickel test section is currently being assembled and will be available for installation in the loop on completion of 5/8-inch tube insert tests.

The 50 KW loop operated a total of 190 hours during this report quarter including 137 hours of condensing operations. Total operating time on this loop is 731 hours. The loop, as presently arranged, is shown in Figure 37.

VI. INSTRUMENTATION

W. H. Bennethum

300 KW Loop

During this quarter much effort has been devoted to reinstrumenting the boiling test section of the 300 KW facility and to improving the quality of data generated by the loop by means of extensive preliminary calibration and selection of thermocouples based on calibration results. The following is a specific discussion of the actual work accomplished.

During June, 1964, a stressed diaphragm type differential pressure transducer with provision for in-place calibration was installed on the 300 KW test boiler to measure pressure drop. The installation is described in Reference 4, Section VI. The transducer, manufactured by Consolidated Controls Corporation, consisted of an Inconel "X" diaphragm mounted in an Inconel housing. The pressure range for the transducer is 0 - 50 psi differential and its time response is approximately 2 milliseconds. Movement of the diaphragm is sensed by a linear variable differential transformer coil mechanically attached to the transducer and activated by a slug of magnetic material located within the transducer's low pressure chamber. The entire assembly was installed in a furnace so that its temperature could be closely controlled during the test period.

After the installation of the system into the 300 KW facility, several full scale calibration runs using inert gas with the transducer at about 500°F were conducted to define the output characteristic curve and the zero and span stability prior to exposure of the transducer to alkali metal. These calibrations indicated a substantial zero shift and a net change in output for a given change in pressure of about 15% at the 15 psi differential pressure level.

After a concentrated effort was made to improve the repeatability of the calibration, with partial success, the transducer was exposed to potassium for the first time with the boiler operating with the 2-inch pitch helical insert. At this time the transducer output indicated a pressure drop compatible with what had been predicted. However, considerable difficulties were encountered subsequent to this exposure when attempts were made to re-calibrate the transducer. These calibrations indicated that the output level for a given differential pressure was becoming less and less. By process of elimination the difficulty was determined to be caused by a mechanical problem within the transducer (probably yielding of the diaphragm). Repair of this transducer will not be attempted. Instead, a replacement transducer, which will have a full range of 15 psi differential pressure and will be capable of operating at temperatures up to 200°F, is being purchased. The replacement transducer is a liquid-filled differential Statham gage, rated at 0 to 15 psi differential.

Although the initial attempt at measuring pressure drop through the test boiler with a differential pressure transducer was not successful due to transducer malfunction, the calibration system did function properly and therefore demonstrated the feasibility of the technique of calibrating in place during loop operation without interferring with loop operation.

In-loop pressure measurements during the operating period for the 6 to 1, pitch to diameter ratio, insert in the 1-inch tube were made with boiler inlet and exit absolute (0 - 150 psia) pressure gages. These are slack diaphragm type (Taylor), stainless steel transducers mounted approximately one foot from the loop piping system and operated at 1000°F during loop operation by individually controlled heating circuits. The net shift in calibration during the period of testing with the 6-inch pitch insert, as obtained from in-place calibrations before and after testing using inert gas pressurization, amounted to approximately 1 psia for the inlet gage and 0.5 psia for the exit gage.

Subsequent to determination that the boiler wall shell thermocouples were reading significantly low (Ref. 4), a new set was fabricated and installed in July. This group of thermocouples with capped, ungrounded junctions was installed in 11 rings of 5 each. This wire consisted of 0.062-inch Inconel sheath, magnesia insulation and platinum 10% rhodium-platinum thermocouple elements. The wire was manufactured by Thermo-Electric Company and passed a standard homogeneity test. Two thermocouples from each roll (approximately

30 ft. per roll) have been calibrated at the freezing points of copper, silver, alumina and zinc. The deviation from the standard calibration was well within the normal tolerance limits.

The 3/4-inch tube boiler installed during September 1964 was instrumented in the same manner with thermocouples made from the same lot of wire as those described above and tested in the same manner. An insert for the 3/4-inch boiler tube was instrumented with 7 thermocouples (0.040-inch Inconel sheath, MgO insulation, chromel-alumel alloy capped, grounded junction), spaced axially over the heat transfer area (Table 2) and located inside the 1/4-inch OD x 0.049-inch wall center body tube so that they would not be in direct contact with alkali metal. This insert is identical to that shown on Drawing No. C119C2845, (Figure 15, Reference 4), except for diameter, pitch and modifications to the cold end to permit the use of a compression type packing gland to hold the thermocouples in place and to serve as a secondary alkali metal seal instead of the braze type seal originally used. A positive inert gas pressure will be maintained within the centerbody tube of this insert to prevent internal oxidation and to serve as a buffer in case of tube failure during operation.

The 7 thermocouples were calibrated in the freezing point apparatus prior to assembly into the insert. Maximum deviation from the thermocouple scale at the copper point was -14.4°F. Average deviation was -12.3°F.

Following shutdown of the loop in mid-August, one thermocouple was removed from each of the test section inlet and exit wells for calibration. These thermocouples were made from 0.032-inch diameter platinum and 10% rhodium-platinum wire installed in a ceramic insulator with an Inconel or L-605 protective tube over the assembly. All parts were assembled with slip fit tolerances and there was no swaging or drawing operation after the assembly.

Calibration checks were performed in a freezing point apparatus. Results showed that the thermocouples in this group, which had been installed since the initial operation of the facility, had undergone a net change in output of 6.5°F (maximum) and were reading approximately 10°F (maximum) less than the International Temperature scale at the freezing point of copper (1981.9°F). Thermocouples in this same group, but which had been installed more recently, had changed calibration by a proportionately lower amount as a function of loop operating time.

Thermocouples were also removed from the 2-inch pitch helical insert for calibration checks. These thermocouples were assembled in 0.040-inch Inco 702 sheath drawn over MgO insulation and consisted of chromel alumel thermocouple elements. There were seven thermocouples in this group, all brazed into a single L-605 cap which served as the upper end of the insert. Calibration results showed a maximum deviation of -12°F from the International Temperature scale at the freezing point of aluminum.

100 KW Loop

A comparison of the three polyphase wattmeters presently used on the loop to measure input power to the preboiler and test section heaters was made using a dummy load capable of dissipating approximately 3.5 KW across the recently installed 50 KW power supply (saturable reactor). The three wattmeters included two electrodynamic (GE Type P3) units, one of which had been calibrated during the first week in August and an Avtron watt computer system which was installed as part of the 50 KW supply. All three of these meters have essentially ±1% full scale accuracy capability and all are operated in conjunction with current transformers so that the current in the measuring circuit never exceeds 5 amperes.

The comparison was made by connecting all three meters across the same load and observing the output at various power levels. Agreement between the two GE P-3 meters was within 4% up to 3.5 KW which was within the full scale tolerance band of the meters. However, the Avtron meter deviated by considerably more than its nominal accuracy tolerance at all power levels up to the 3.5 KW dummy test load limit. Therefore, the performance of the Avtron meter was studied further. Observation of the Avtron meter output at the power levels used for normal loop operation indicated much closer agreement with the P-3 meter than was noticed at lower power settings with the dummy load. For example, at 12.42 actual KW (P3) the Avtron was in error by 3.87% which is within the full scale accuracy tolerance of the instrument. At 3.3 KW, the Avtron unit was off by 57%.

Poor performance at low power seems to be a characteristic of the instrument. Attempts are being made to define the minimum power measuring levels of the instrument with the vendor. In the meantime the P3 meter is connected across the load permanently and is used to determine actual power levels.

The liquid level probe in the recently installed dump tank of the 100 KW facility was calibrated during initial filling of the loop. This is a "J" type probe, the sheath of which acts like a resistance being shorted by alkali metal. The measured parameter is voltage drop between the probe tip and the alkali metal level which is essentially at ground potential. The calibration was performed by weighing individual charges of potassium as the dump tank was filled. The sensitivity of the measuring system was 3.55 millivolts per inch change in level with 5 amperes through the probe sheath.

50 KW Loop

A new set of thermocouples was installed in the new 5/8-inch diameter drilled test section. These were 0.032-inch and 0.062-inch diameter Inco 702 sheathed, chromel alumel thermocouples with MgO insulation and capped grounded junctions. The 0.032-inch thermocouples are used in the 0.050-inch diameter holes in the wall of the nickel test piece and in the wells at the potassium inlet and outlet. The 0.062-inch thermocouples are used in the wells at the sodium inlet and outlet, where space is available for these larger thermocouples. Integral reference junctions were provided within each thermocouple assembly to eliminate any errors caused by intermediate lead wire. Wire homogeneity was checked following installation. Although all of the thermocouples passed the homogeneity test, in place calibration on the loop indicated that the differences between the thermocouples were significantly larger than had been experienced in the preceding batch. There are several possible causes for this problem. One cause might be that, due to the nature of the configuration of the thermocouple assembly and the length of immersion in the test section wall, the homogeneity test performed following thermocouple installation was not effective nor sufficiently sensitive. Therefore, any damage during the thermocouple installation (which is an extremely difficult process) would not necessarily be apparent in the post-installation homogeneity test. Another possible cause for the large differences in thermocouple calibrations might be the fact that the thermocouples came from two separate batches of wire. Two batches of wires were used because of previous installation difficulties when it was discovered that thermocouples from one batch were slightly over-size and would not fit in all locations.

For this reason, it was decided to install another set of thermocouples, all from one batch of wire, to eliminate a major factor in the inconsistency between thermocouples. This was done using a set of thermocouples which had been intended for the 3/8-inch drilled test section. The results of in place calibrations are not yet available so it is not possible to define the net gain achieved by replacing the mixed batch of thermocouples.

VII. MATERIALS SUPPORT

W. R. Young

300 KW Loop

Loop Maintenance. The Type 316 stainless steel dump line valve in the secondary (potassium) loop of the 300 KW facility was replaced with a new Type 316 stainless steel valve. The valve was butt welded to the L-605 pipe and tank boss using L-605 filler wire. Also, a Type 316 stainless steel bellows assembly was installed in the L-605 alloy throttle valve of the secondary loop. The bellows flanges were welded to the L-605 valve plug and valve body.

The second helical insert with a 5.5-inch pitch was installed in the 1.0-inch OD test section. The 2-inch pitch insert was cut at the top cap on the boiler test section and removed. The new helical insert was then positioned and welded to the top of the boiler test section.

Single Tube Test Section. A 0.75-inch OD by 0.040-inch wall, L-605 alloy tube was incorporated into a new single tube boiler test section. The design and fabrication of this test section were the same as those employed previously. Installation of this test section in the 300 KW facility was completed.

A new helical swirl insert, having a pitch to diameter ratio of six, was fabricated. The design of this insert was modified slightly to provide a mechanical rather than brazed seal for the insert thermocouples. This change was made to facilitate thermocouple installation. The completed helical swirl insert was then installed in the facility.

Fabrication Studies. The bending of thin wall L-605 tubing suitable for the hockey stick boiler design proved satisfactory. A piece of 0.75-inch diameter 0.04-inch wall tubing, bent 90^{o} to a 2.5-inch radius by draw bending, was checked for wall reduction. The tube wall decreased 0.005-inch in thickness on the outside of the bend during forming. This was considered acceptable for future boiler designs.

Joining of boiler tubes to headers by welding the tube to a header boss from the inside was discussed with the Baldwin-Lima-Hamilton Corporation. This type of welding is accomplished automatically by the tungsten arc process through rotation of an electrode inserted inside the joint through the header (Ref. 8). Crevice free joints that were radiographed for soundness have been produced in stainless steel heat exchangers by the B-L-H Corporation using this process. The feasibility studies of this process as applied to fabrication of L-605 alloy boilers have been deferred until component design studies are completed.

100 KW Loop

The fabrication of the new 3/4-inch schedule 80 Cb-1%Zr alloy boiler and preheater coil sections of the 100 KW loop was completed. The new section was assembled in the Laboratory. All welding was conducted in a high purity helium atmosphere using the vacuum-purged welding chamber. All weldments were post-weld annealed at 2200°F for one hour.

The new section was installed in the facility with two field welds. One field weld was located in the 3/4-inch pipe at the top of the condenser coil; the other was located in the 3/8-inch pipe adjacent to the EM pump. After welding, the joints were annealed at 2200°F for one hour to minimize aging embrittlement during loop operation.

The fabrication of helical swirl inserts required for future 100 KW loop tests also proceeded. Orders were placed for machining required to produce the first helical swirl, which has a pitch-to-diameter ratio of six.

50 KW Loop

A new test section containing drilled thermocouple holes in the 0.625-inch inside diameter nickel tube was fabricated. The Type 316 stainless steel tubes were successfully vacuum brazed at each end of the nickel tube without plugging of the thermocouple holes, four of which were located radially about 0.08-inch from the brazed joints. The Type 316 stainless steel jacket and bellows were then assembled on the test section.

The slotted thermocouple grooves of the 0.625-inch inside diameter test section were not brazed successfully. Thermal gradients in the vacuum furnace caused the braze alloy to flow profusely to one end and resulted in voids along the slots. Further work on this section was discontinued pending test evaluation of the drilled type test section.

The 50 KW boiler was rebuilt after a leak developed at one of the electrical heaters. The old heaters were removed and replaced. Four nucleation sites (hot fingers) were added to the bottom row of heaters and two other nucleation sites were welded to the boiler shell. The boiler was then installed in the facility along with the 0.625-inch test section containing drilled thermocouple holes.

The new 0.375-inch test section containing drilled thermocouple holes is currently being assembled. Type 316 stainless steel tubes were successfully vacuum brazed at each end of the nickel tube. Welding of the Type 316 stainless jacket and bellows will be completed during the next report period.

Pool Boiling Apparatus

The pool boiling apparatus developed a small leak between the vacuum chamber surrounding the heater and the liquid metal boiling chamber. The leak is located in the AS-514 (V-35Cb) braze between the Cb-1%Zr alloy sleeve and the Mo-0.5Ti alloy heater plate.

The heater had been inadvertently run in an atmosphere of nitrogen rather than in vacuum or inert gas required for operation. The resulting contamination was most severe in the vanadium base brazing alloy and undoubtedly was the cause of the leakage found. The Cb-1%Zr sleeve was also severely contaminated as evidenced by complete embrittlement of foil attachments to the sleeve.

The repair of this apparatus to produce material conditions equivalent to the as-built structure would require complete replacement of the heater, Cb-1%Zr sleeve, and bimetallic joint attachment to the L-605 alloy containment vessel. However, an attempt can be made to replace the joint between the heater and Cb-1%Zr alloy sleeve by rebrazing with an alloy having a brazing temperature near 2200°F. This lower temperature is required to avoid overheating the original bimetallic joint which was brazed at 2150°F.

VIII. ANALYSIS

G. L. Converse

In previous Quarterly Reports the analytical task has been concerned largely with problems of two-phase pressure drop. For example, in Quarterly Progress Report 6 (Ref. 7) the acceleration and elevation components of the two-phase pressure drop were analyzed, while in Quarterly Progress Report 8 (Ref. 4) the frictional component of the pressure drop was considered. Some success has been obtained with the simple homogeneous model described in References 4 and 7. Figures 21 and 22 of Reference 4 and Figures 9 and 10 of the present Quarterly Report give some indication of the accuracy which can be expected with this model. Although the work on two-phase pressure drop is by no means complete, it was felt that the degree of success obtained in the pressure drop prediction warranted the extension of the analytical effort into other areas. The areas of most immediate concern would seem to be the prediction of heat transfer coefficients in the nucleate, transition, and film boiling regimes, and the problem of overall loop stability.

Analytical Task Initiated During the Current Quarterly Period

Analytical work has been initiated in the above areas. The immediate effort concerns itself with the following task:

1. The prediction of boiling inception, i.e., the wall superheat required to produce nucleation.
2. The prediction of slip and void fractions.
3. The prediction of critical flow.

Preliminary results will be made available in Quarterly Progress Report No. 10. A brief discussion of each task including the method of approach and current status is included below.

The Prediction of Boiling Inception. The problem of boiling inception is intimately connected both to the problems of predicting the heat transfer coefficient and to the problem of overall loop stability. In order to predict the nucleate boiling heat transfer coefficient, it is necessary to ascertain the method of vapor generation. For example, vapor may be generated by nucleation (i.e., bubble formation of the wall) or by evaporation at the liquid vapor interface. Both mechanisms have been observed (Ref. 9). It is evident that the latter mechanism cannot be present until an interface is available, and, therefore, that the first vapors must be formed by nucleation. If the superheat required to produce nucleation is high enough, a relatively large amount of vapor may be generated resulting in a sudden "explosion" of liquid into vapor and a corresponding pressure surge in the loop. The above mechanism has been postulated as a possible cause of loop instability (see for example, Ref. 10).

In order to predict the wall superheat required for nucleation, the method proposed by Rohsenow and Bergles (Ref. 11) will be utilized. This method has met with some success when applied to water (Ref. 11) and Freon (Ref. 9).

The Prediction of Slip and Void Fraction. A knowledge of the slip and void fraction is essential, both in order to obtain a precise prediction of two-phase pressure drop and in order to predict the loop transfer functions. The latter would be a prerequisite to any attempt to analyze the transient and/or unstable behavior of the loop.

The momentum exchange model of Levy (Ref. 12) will be utilized to generate working curves of slip and void fractions.

The Prediction of Critical Flow. Critical flow models have been proposed by Levy (Ref. 13) and Fauske (Ref. 14) among others. A computer program has been written utilizing the NRL properties (Ref. 3) to yield these results. The program is working and results will be included in Quarterly Progress Report No. 10.

Results Obtained During the Current Quarterly Period

In addition to the above task the data from the 300 KW facility given in Table A-2 of Appendix A in the present report was analyzed in an effort to ascertain the feasibility of determining the static pressure by use of thermocouples in conjunction with the saturation curve. This procedure could be useful in determining the local pressure distribution in the 300 KW boiler in those tests in which the centerline temperatures are measured along the length of the boiler.

The above procedure could be successful if the liquid and vapor phases of the mixture are at the saturation temperature corresponding to the static pressure. It is unlikely that any such simple situation exists; however, if the degree of superheating or subcooling of the phases with respect to the static pressure is small, and the rate of change of temperature with pressure along the saturation curve is large, an accurate determination may still be possible.

In this section simultaneous measurements of static pressure (Table A-2 of Appendix A of this report) and temperature obtained from the 300 KW facility will be analyzed in order to ascertain if thermocouples provide a reasonably accurate method of determining the static pressure of the mixture. The data utilized encompass the following range of variables:

Quality (%)	2.1	to	97.4
Temperature (^{o}F)	1486	to	1762
Mass velocity in lbs/sec-ft^2	15.63	to	170.9

Test Geometry. The geometry of the test is shown in Figure 38. A helical insert with a 2-inch pitch was inserted in an 0.922-inch ID tube. The center body of the helix consisted of a 1/4-inch OD hollow tube with a 0.049-inch wall thickness. Seven chromel-alumel thermocouples were located in the tubular center body which was filled with argon under a slight positive pressure. About 2½-inches upstream of the uppermost thermocouple, an absolute pressure gage was located.

Accuracy of the Test. The pressure gage has a full scale reading of 150 psia. The manufacturer's specification indicates an accuracy of 1% of full scale or about $1\frac{1}{2}$ psi. In order to improve the accuracy of the test, the gage was carefully calibrated both before and after the test. The results of the calibrations are shown in Figure 39. All points taken during the calibration can be included within an error band of $\pm$ 0.5 psi. This is taken to be the accuracy of the gage. Past experience on the 300 KW facility has indicated that the thermocouples are accurate within about $1^{o}F$.

Test Results. Figure 40 shows a pressure versus temperature plot obtained by plotting the measured temperature against the measured pressures. The saturation curves obtained by Battelle (Ref. 14) and NRL (Ref. 3) are shown on the same figure. In Figure 41, the pressure predicted from the thermocouple (by use of the saturation curve from Reference 3) has been plotted against the pressure measured by the gage. The maximum deviation from a 45^{o} line is about + 0.6 psi to -0.95 psi.

In an effort to determine whether the thermocouple was reading static or total (i.e., recovery) pressure, Figures 42 and 43 were constructed. In Figure 42 the difference between total and static pressure has been plotted against vapor velocity for several temperatures. In order to construct these curves, potassium vapor was treated as a perfect gas. In Figure 43 the difference in the pressure obtained from the thermocouple reading and that indicated by the gage has been plotted against the superficial vapor velocity.

If the pressure obtained from the thermocouple reading was the total pressure, a trend somewhat similar to that of Figure 42 would be expected. Although the accuracy of the test is not sufficient to permit any final conclusion to be drawn, the data appear to indicate that the pressure obtained from the thermocouple reading is most likely the static pressure.

Conclusion. It is concluded that within the accuracy of the test, thermocouples can be used to obtain static pressure when the configuration of Figure 38 is employed.

IX. POOL BOILING HEAT TRANSFER INVESTIGATION

Development of a leak in the pool boiling test apparatus prevented accomplishment of any experimental work this quarter. Further discussion of this is given in Section VII, Materials Support.

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TABLE I

BOILING TEST PLAN FOR THE 100 KW FACILITY

Test Set No.	Saturation Temp., ^{o}F	Mass Velocity lb/sec-ft^2	Nominal Heat Flux Btu/hr-ft^2	Range Exit Quality
1	1800	12	60,000	Up to 90 to 100% or as limited by onset of film boiling
2	1800	12	100,000	
3	1800	17	60,000	
4	1800	17	100,000	
5	1800	17	175,000	
6	2100	12	60,000	
7	2100	12	100,000	
8	2100	17	60,000	
9	2100	17	100,000	
10	2100	17	175,000	

TABLE II

300 KW BOILER INSERT
THERMOCOUPLE LOCATIONS

Period of Test	Thermocouple No.	Distance From Thermocouple Junction to Reference Plane Inches	Pitch Diameter	Nominal Tube Size Inches	Actual Tube I-D Inches
10/2/64 to date	1	100.25	6	3/4	.670
	2	90.75	6	3/4	.670
	3	78.0	6	3/4	.670
	4	56.81	6	3/4	.670
	5	37.5	6	3/4	.670
	6	24.94	6	3/4	.670
	7	10.5	6	3/4	.670
7/18/64 - 8/11/64	1	98.19	6	1	0.922
	2	89.19	6	1	0.922
	3	73.19	6	1	0.922
	4	49.19	6	1	0.922
	5	33.19	6	1	0.922
	6	21.19	6	1	0.922
	7	11.19	6	1	0.922
5/6/64 - 7/12/64	1	91.44	2	1	0.922
	2	77.25	2	1	0.922
	3	63.44	2	1	0.922
	4	69.50	2	1	0.922
	5	35.44	2	1	0.922
	6	21.44	2	1	0.922
	7	12.94	2	1	0.922

All thermocouples have been .041-inch O.D. Inconel or Inco 702 sheath, MgO insulation, chromel alumel (Type K) with capped grounded junctions installed in a .250-inch O.D. x 0.049-inch wall L-605 center body tube. There has been no attachment to the tube in the vicinity of the hot junction.

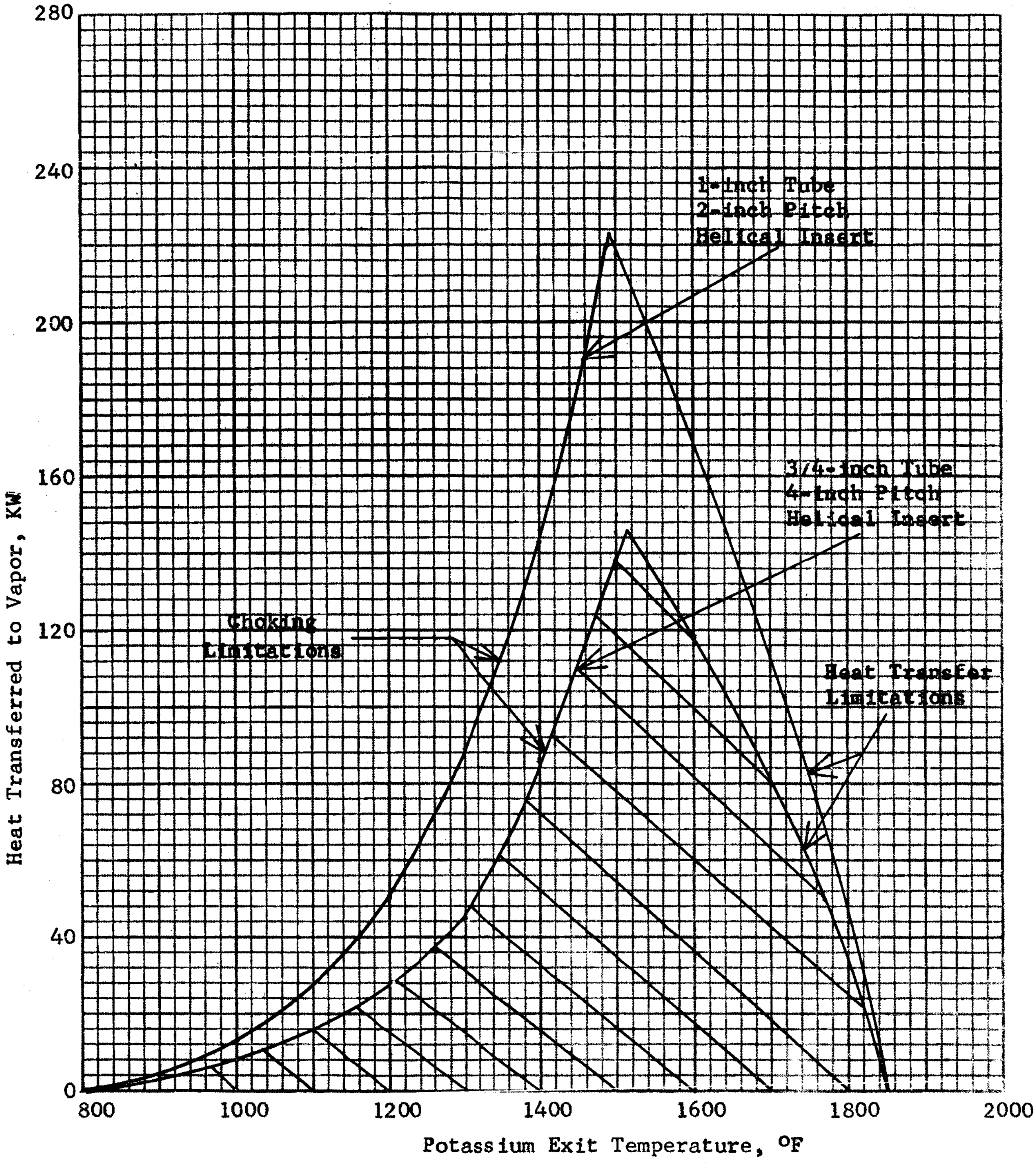


Figure 1. Comparison of the Potential Operating Capabilities of the 1-inch and 3/4-inch 300 KW Boiler Test Sections

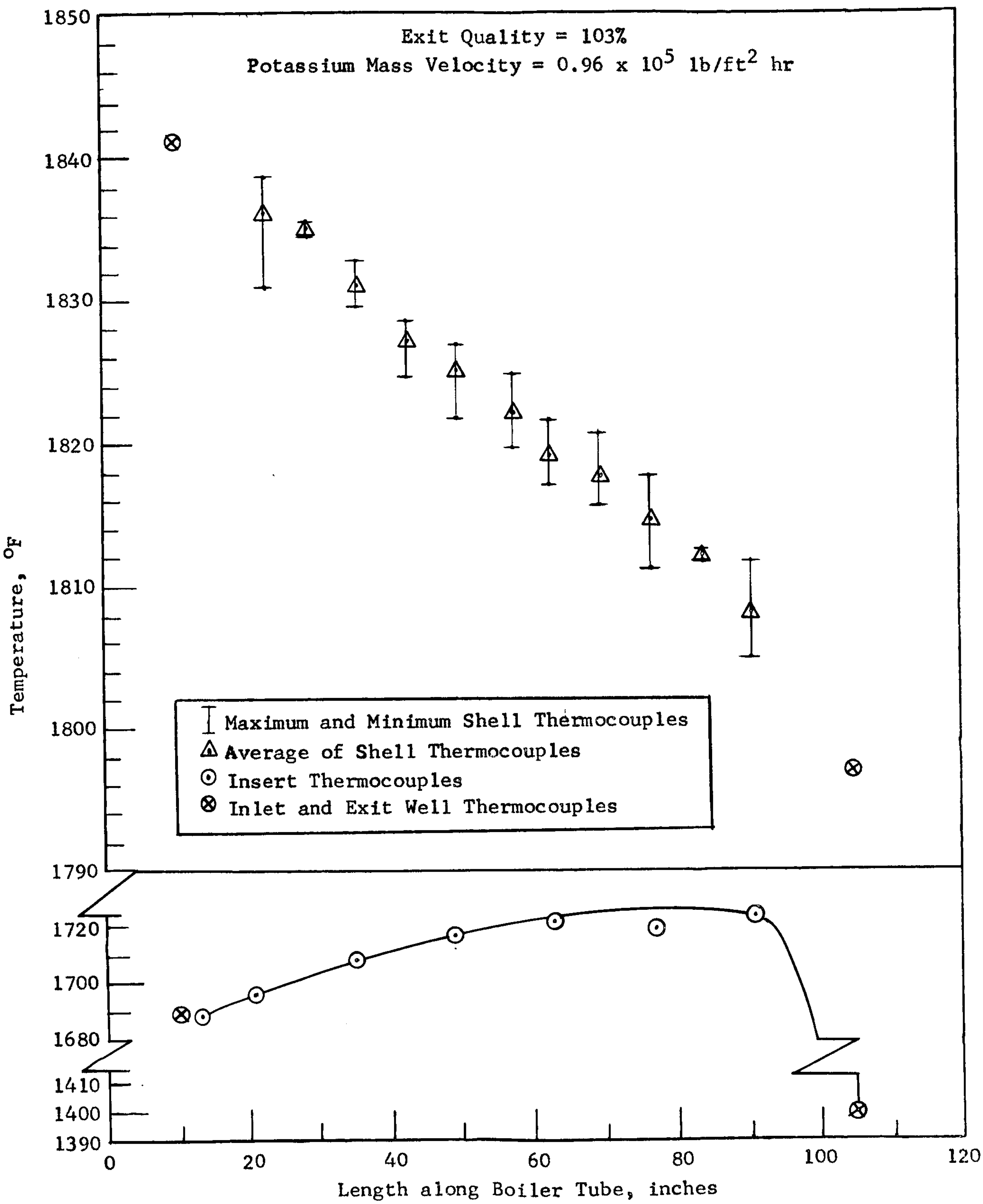


Figure 2. Temperature Profiles from 300 KW Facility (2-inch Pitch Insert). Data Obtained at 2300 hours on 5/26/64.

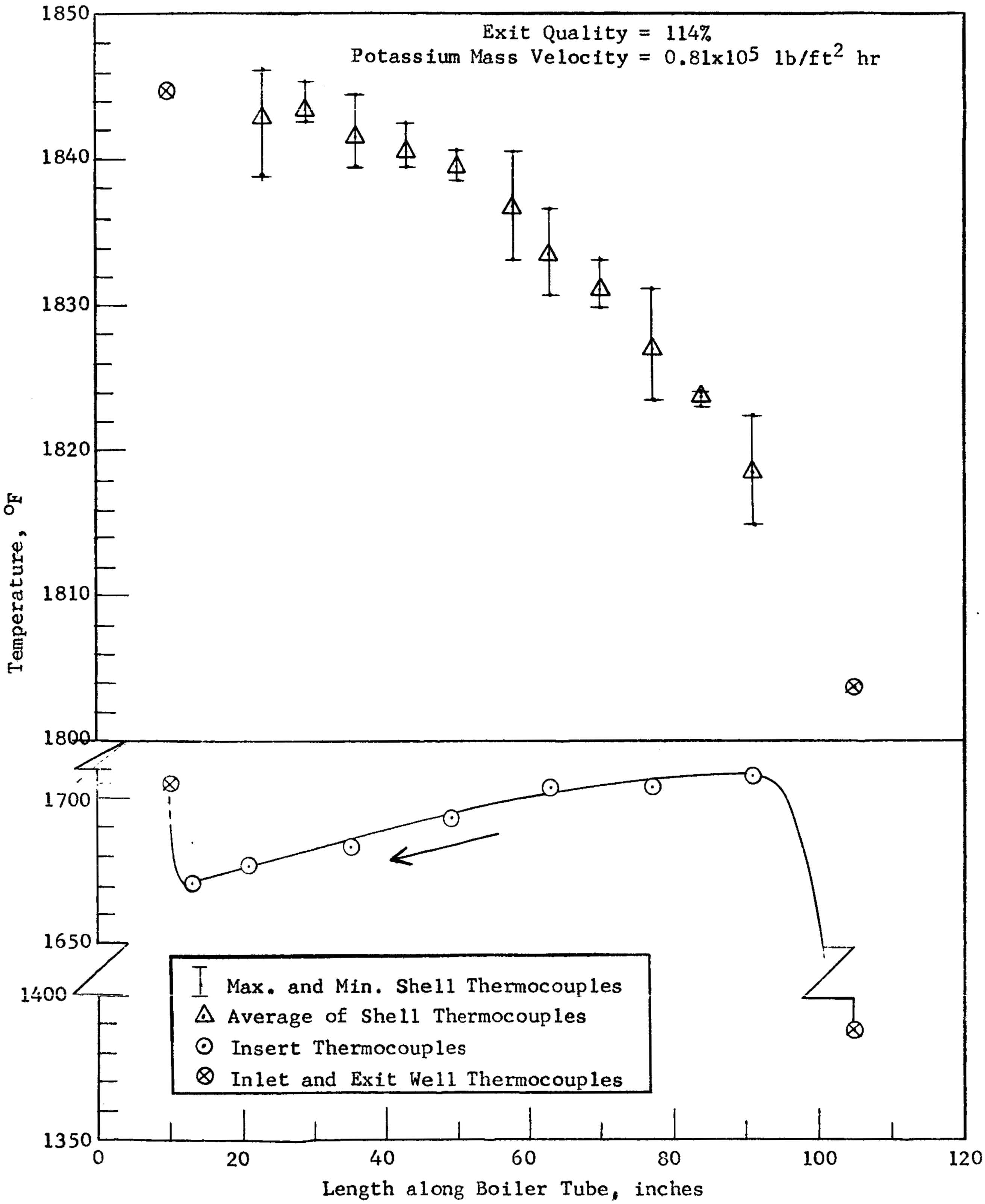


Figure 3. Temperature Profiles from 300 KW Facility (2-inch Pitch Insert). Data Obtained at 2345 hours on 5/26/64.

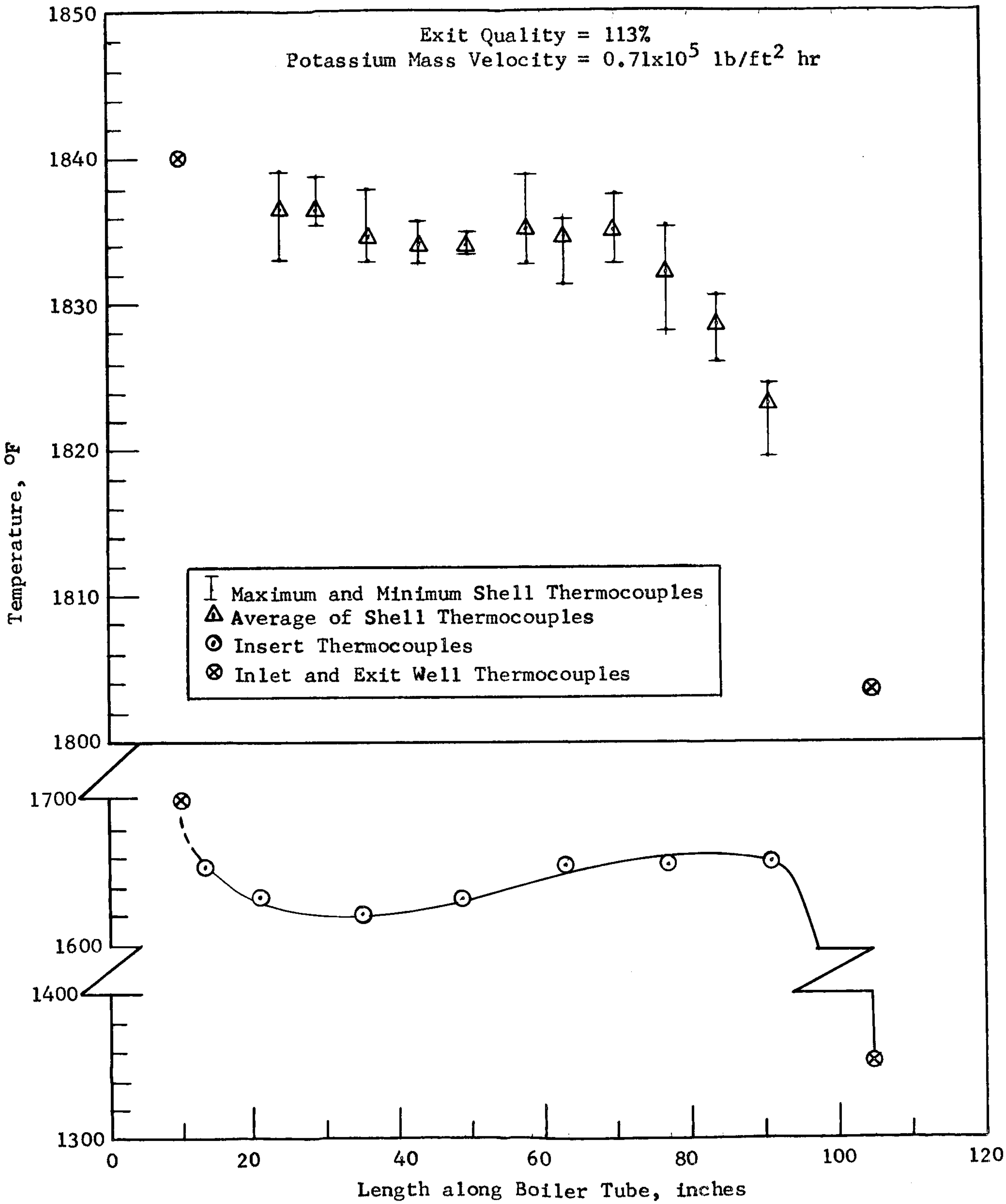


Figure 4. Temperature Profiles from 300 KW Facility (2-inch Pitch Insert). Data Obtained at 0005 hours on 5/27/64.

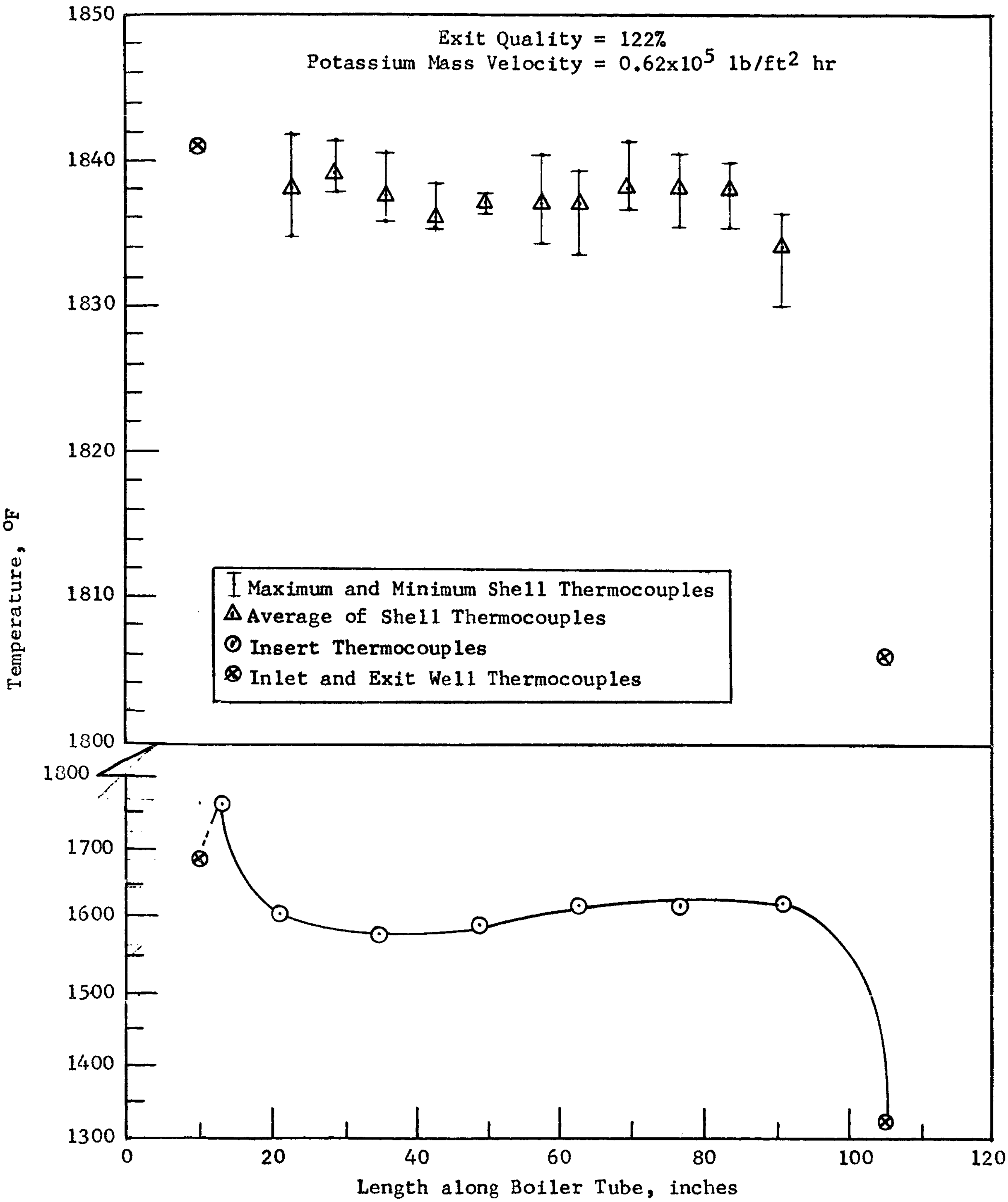


Figure 5. Temperature Profiles from 300 KW Facility (2-inch Pitch Insert). Data Obtained at 0020 hours on 5/27/64.

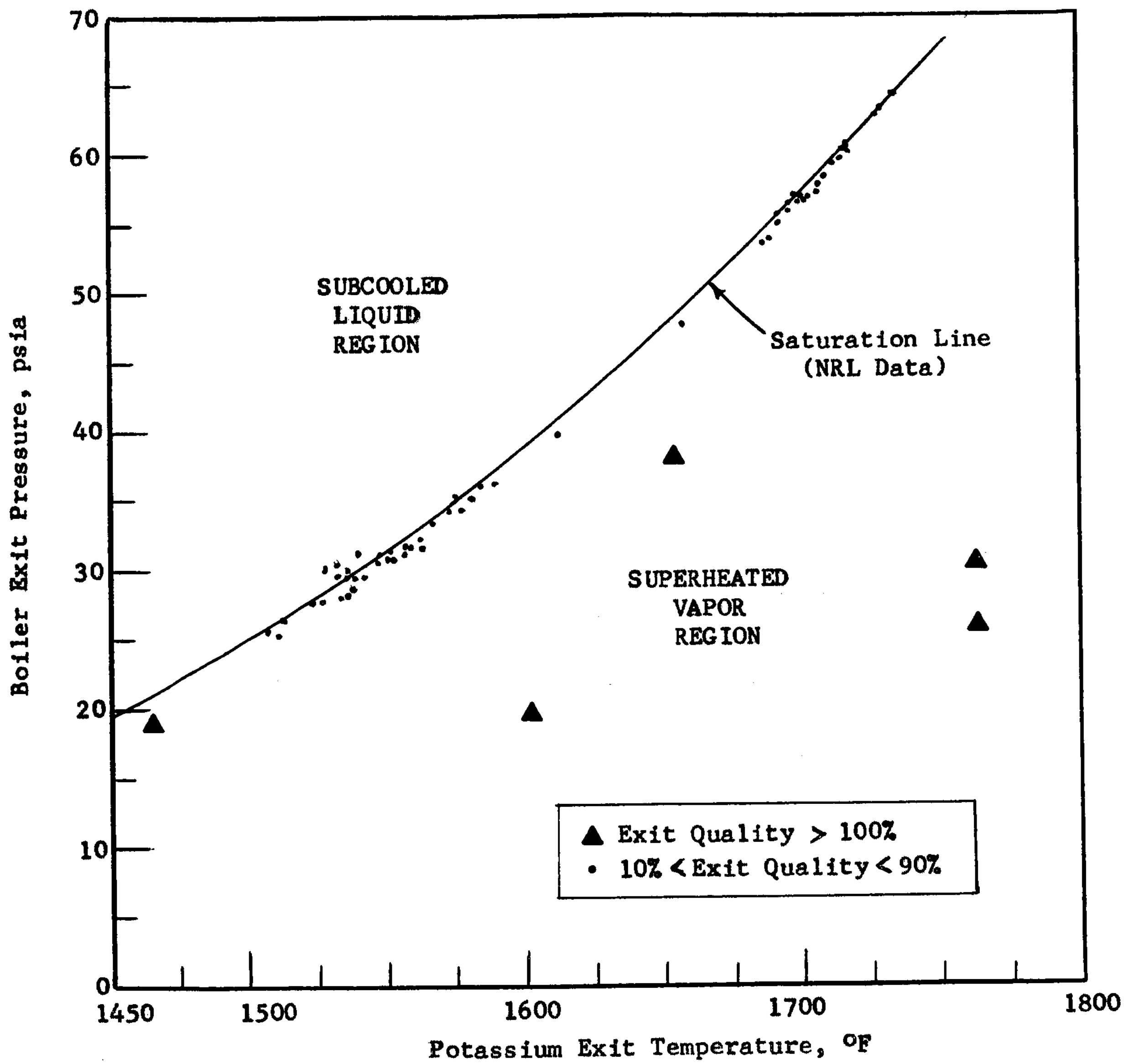


Figure 6. Experimental Pressure-Temperature Data With the 2-inch Pitch Insert (300 KW Facility).

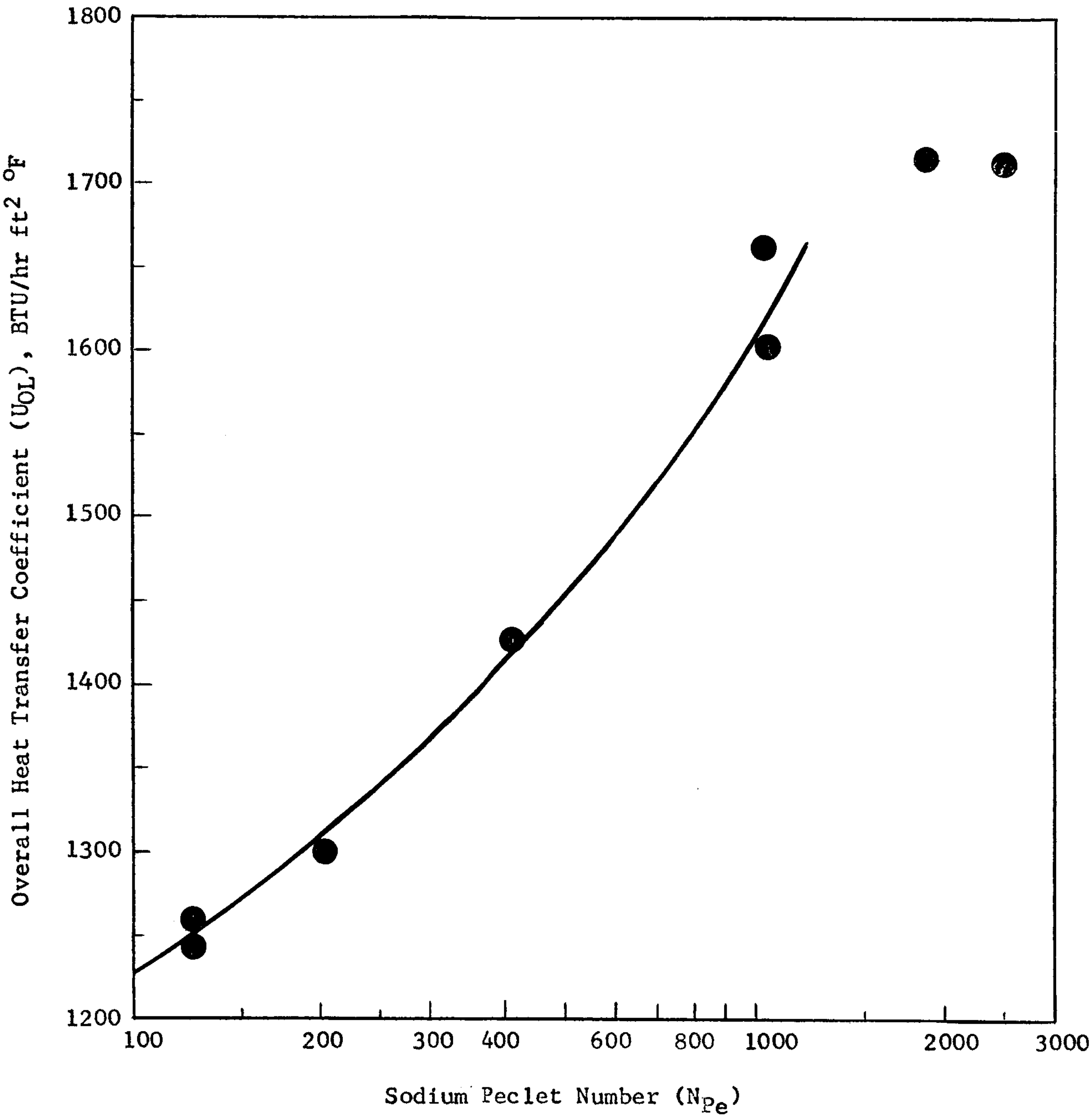


Figure 7. Overall Liquid-Liquid Heat Transfer Coefficients at Constant Potassium Flow and Temperature (300 KW Facility).

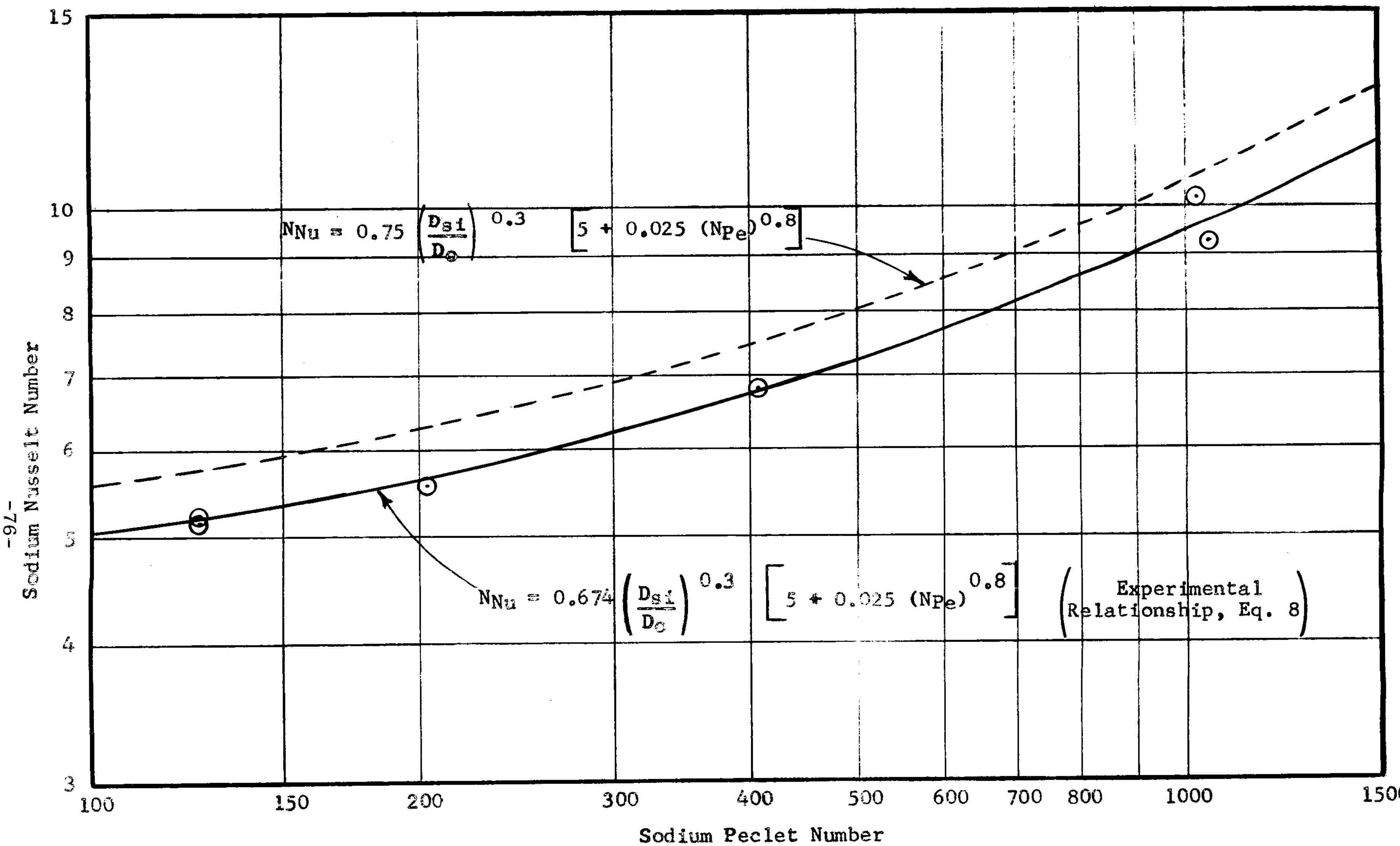


Figure 8. Experimental Liquid Sodium Nusselt-Peclet Number Relationship (300 KW Facility).

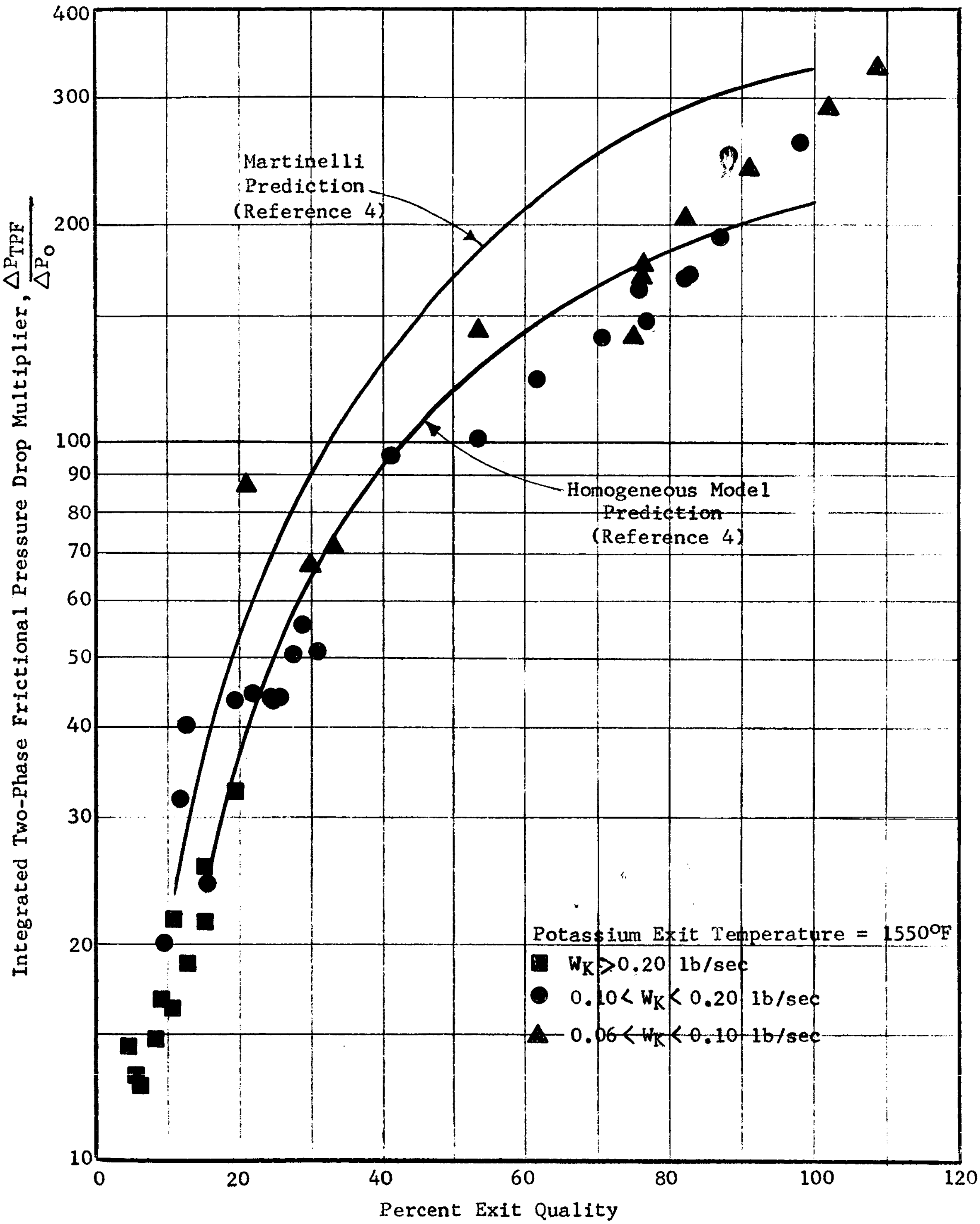


Figure 9. Boiling Potassium Pressure Drop Multipliers As a Function of Exit Quality (300 KW Facility).

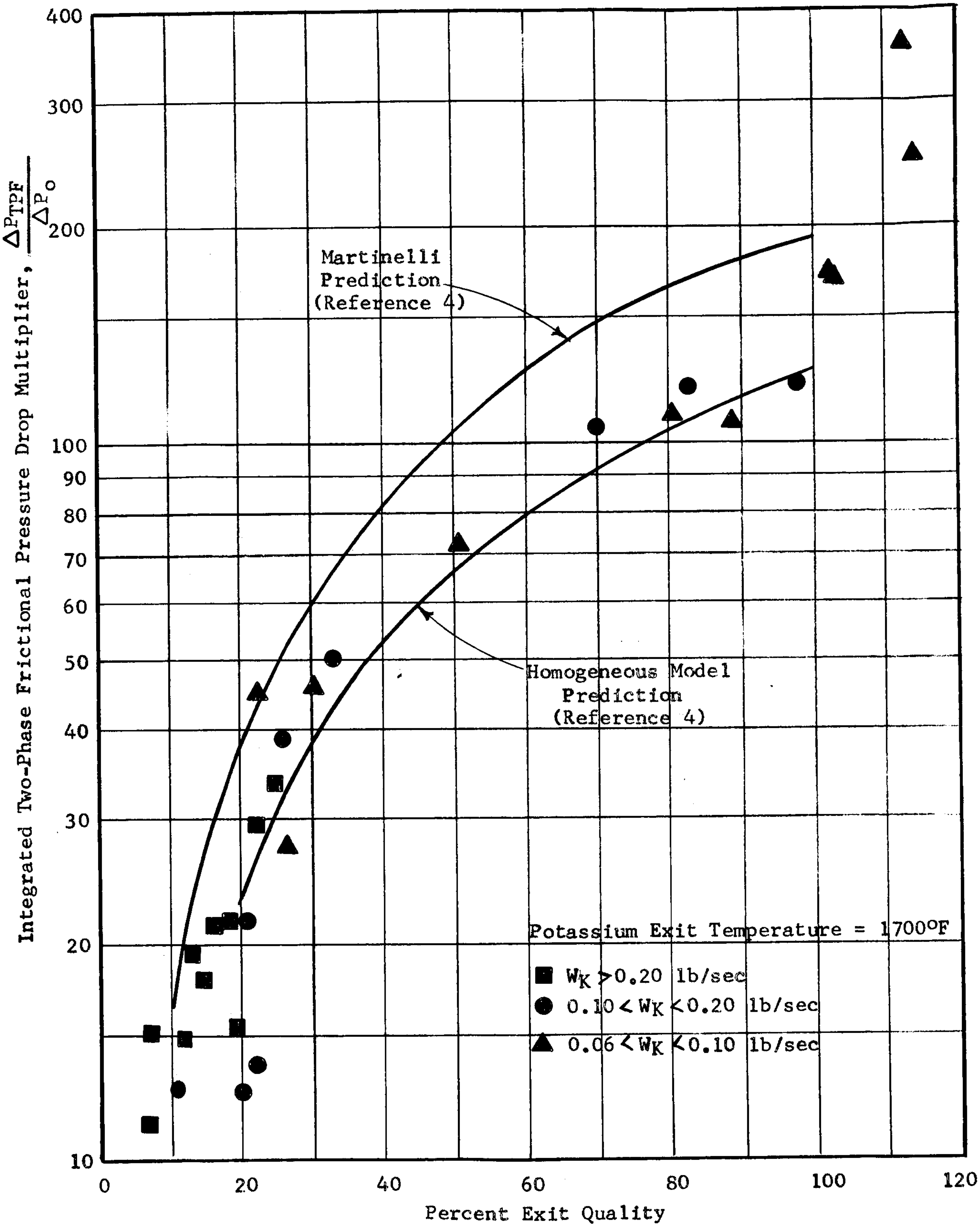


Figure 10. Boiling Potassium Pressure Drop Multipliers As a Function of Exit Quality (300 KW Facility).

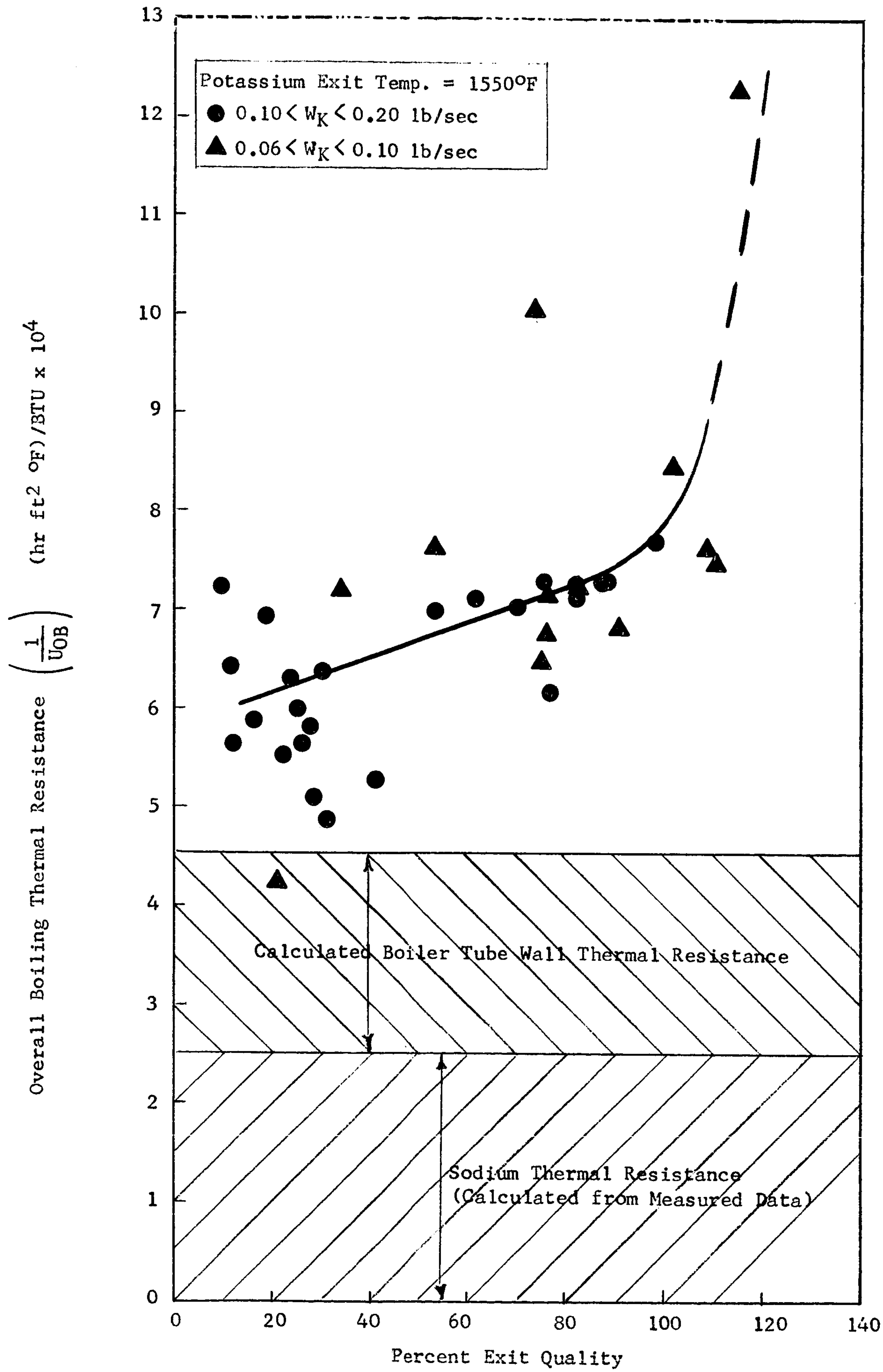


Figure 11. Overall Boiling Thermal Resistance with 2-inch Pitch Insert As a Function of Exit Quality (300 KW Facility).

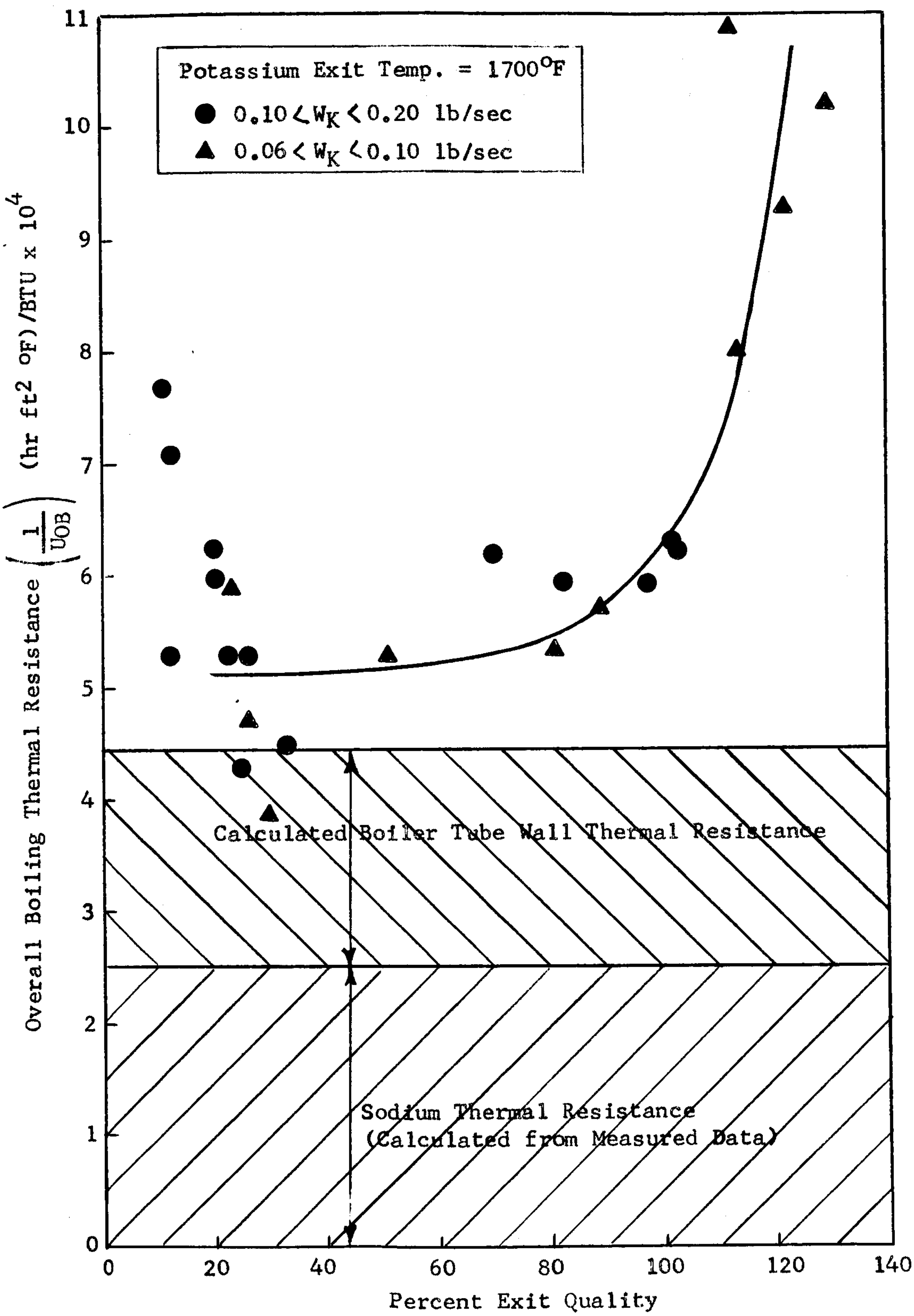


Figure 12. Overall Boiling Thermal Resistance with 2-inch Pitch Insert As a Function of Exit Quality (300 KW Facility).

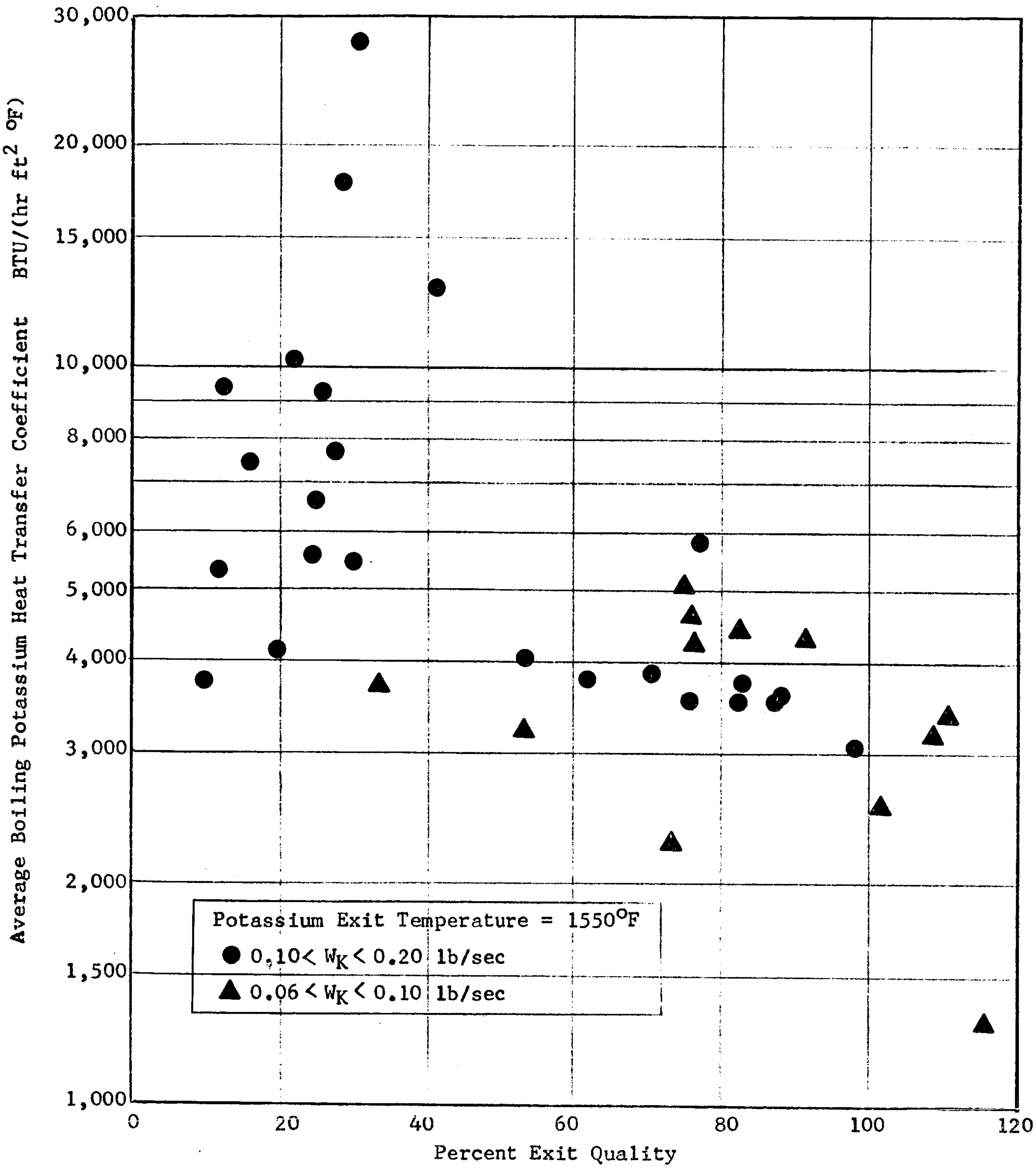


Figure 13. Average Boiling Potassium Heat Transfer Coefficients with 2-inch Pitch Insert As a Function of Exit Quality (300 KW Facility).

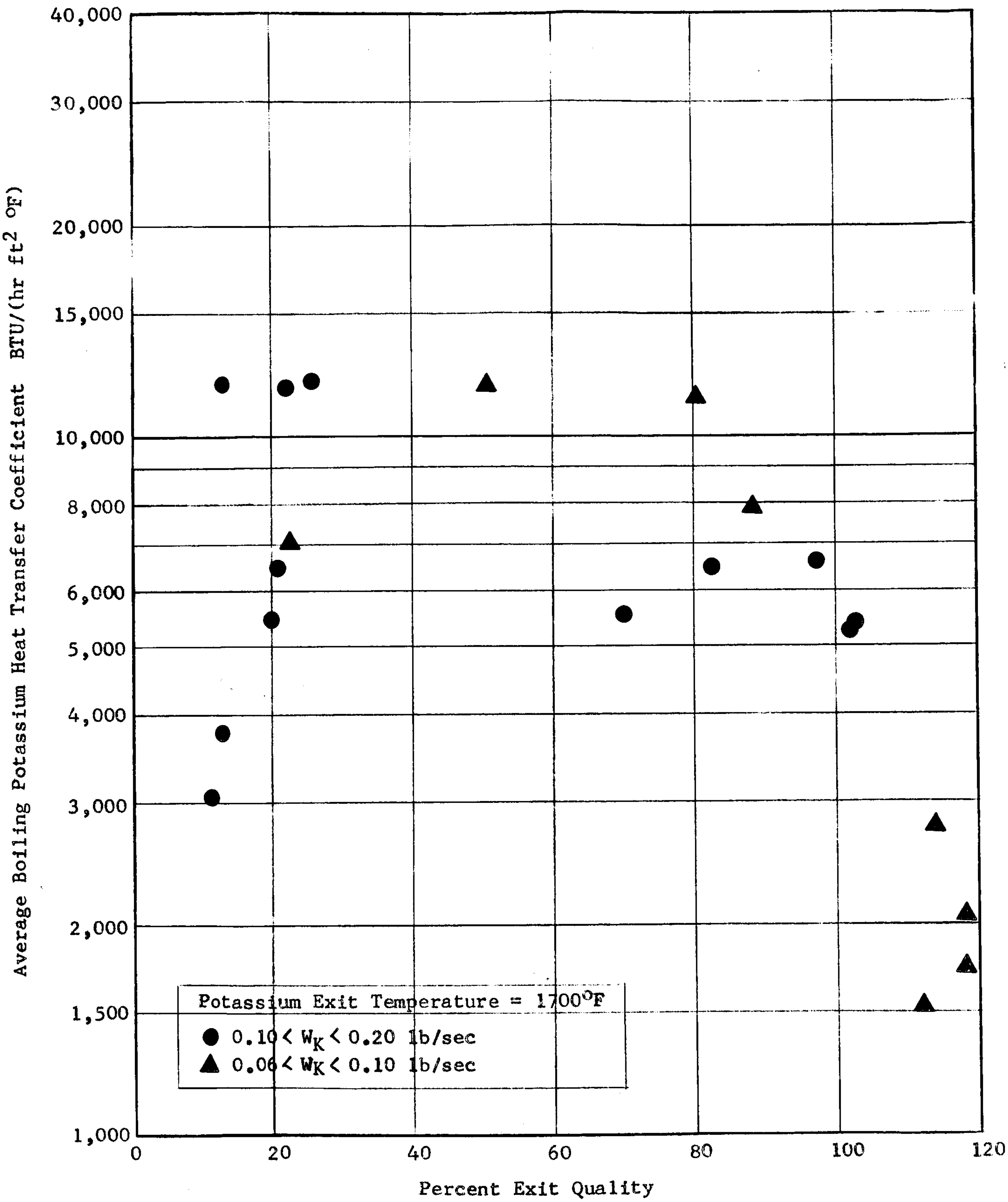


Figure 14. Average Boiling Potassium Heat Transfer Coefficients with 2-inch Pitch Insert As a Function of Exit Quality (300 KW Facility).

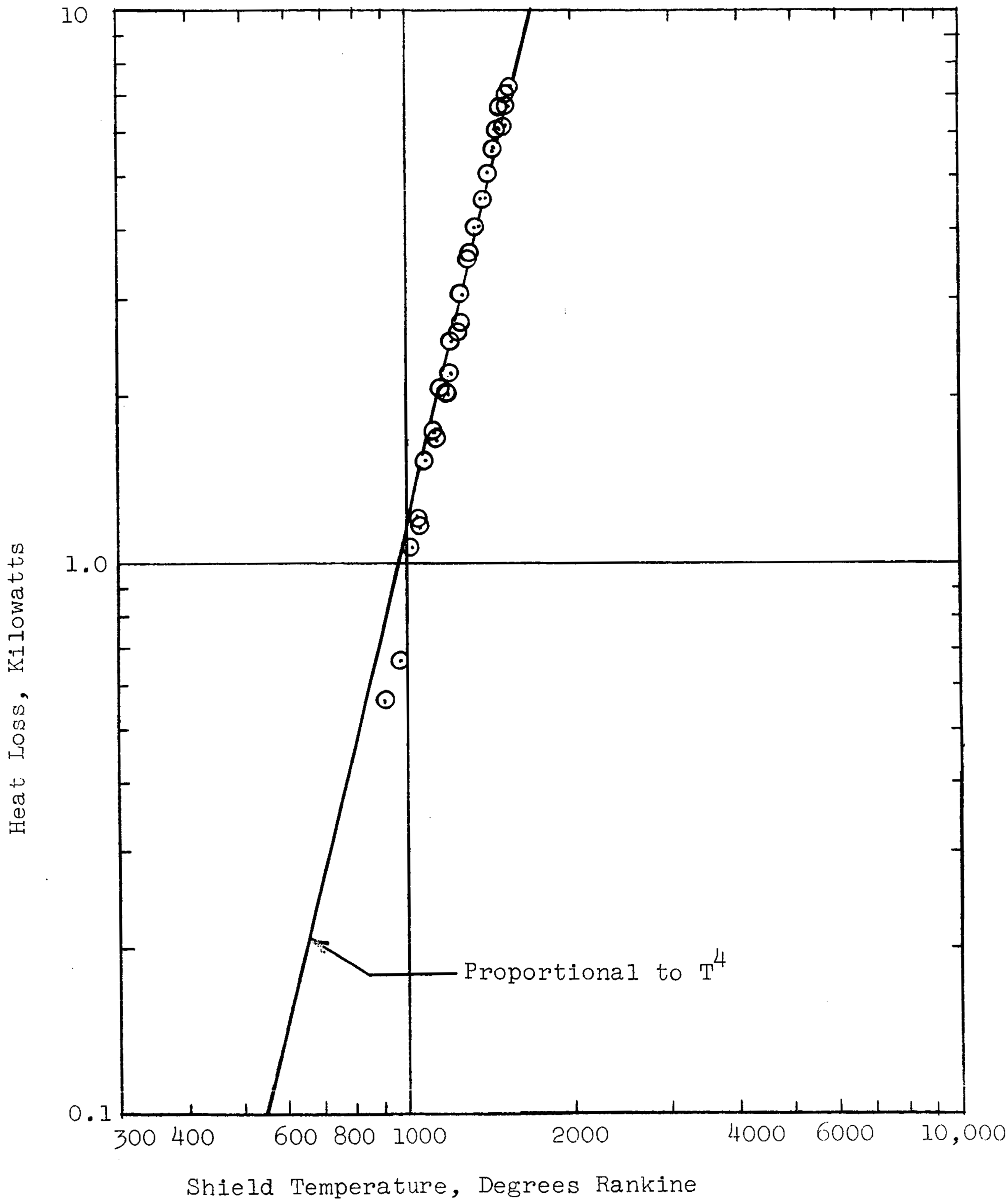


Figure 15. Preboiler Heat Loss in the 100 KW Facility.

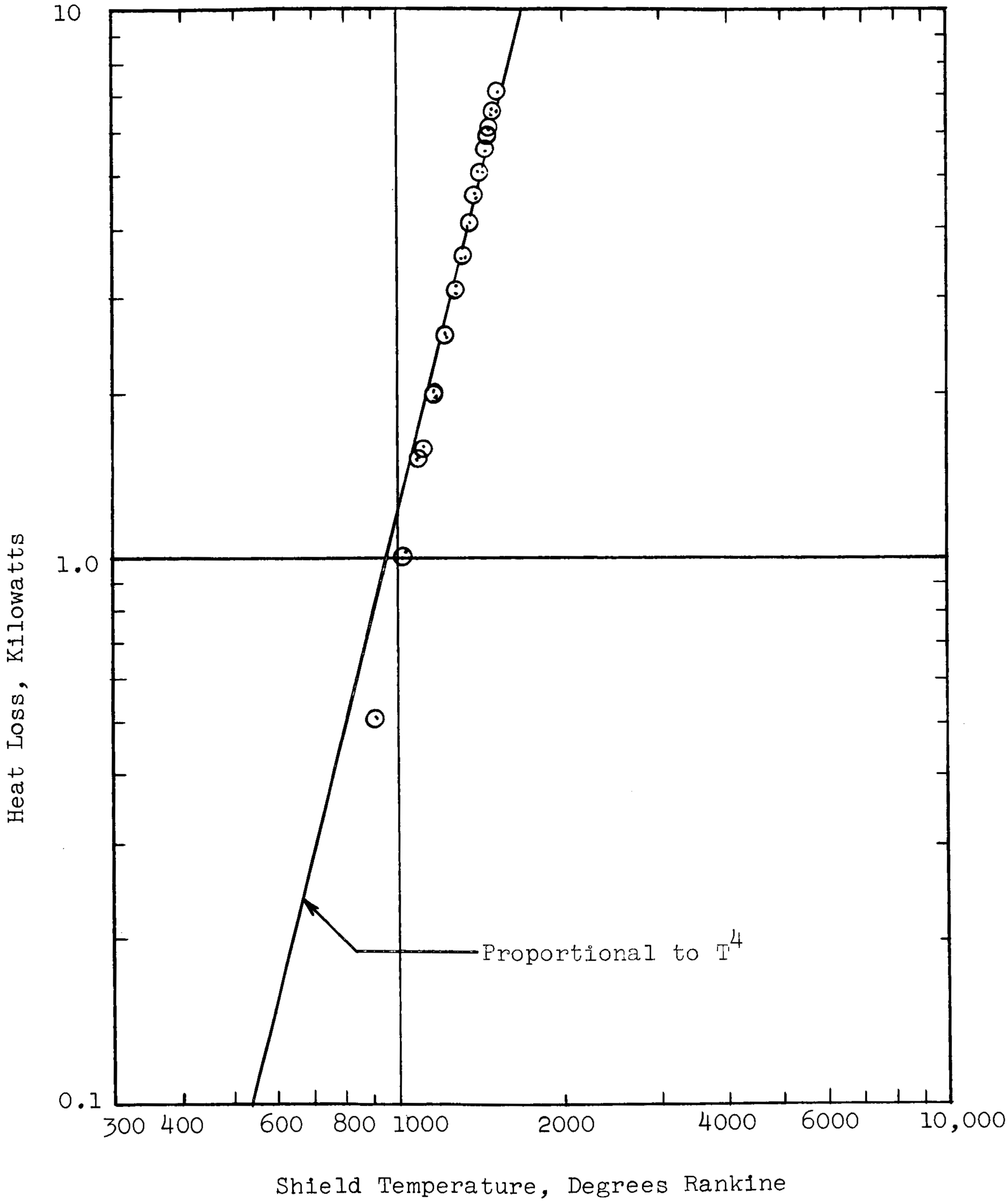


Figure 16. Test Section Heat Loss in the 100 KW Facility.

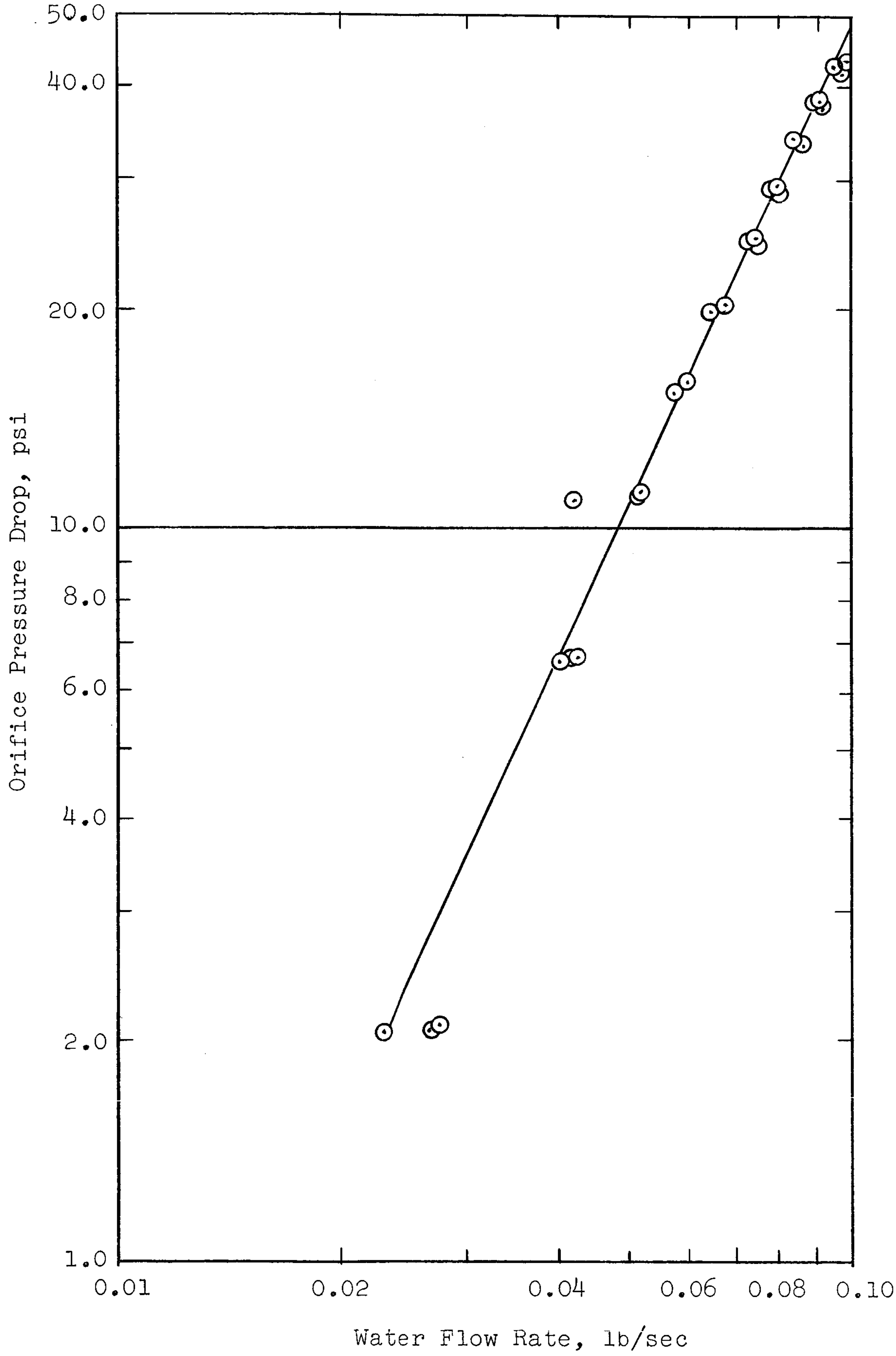


Figure 17. Water Pressure Drop Calibration of the 100 KW Loop Orifice

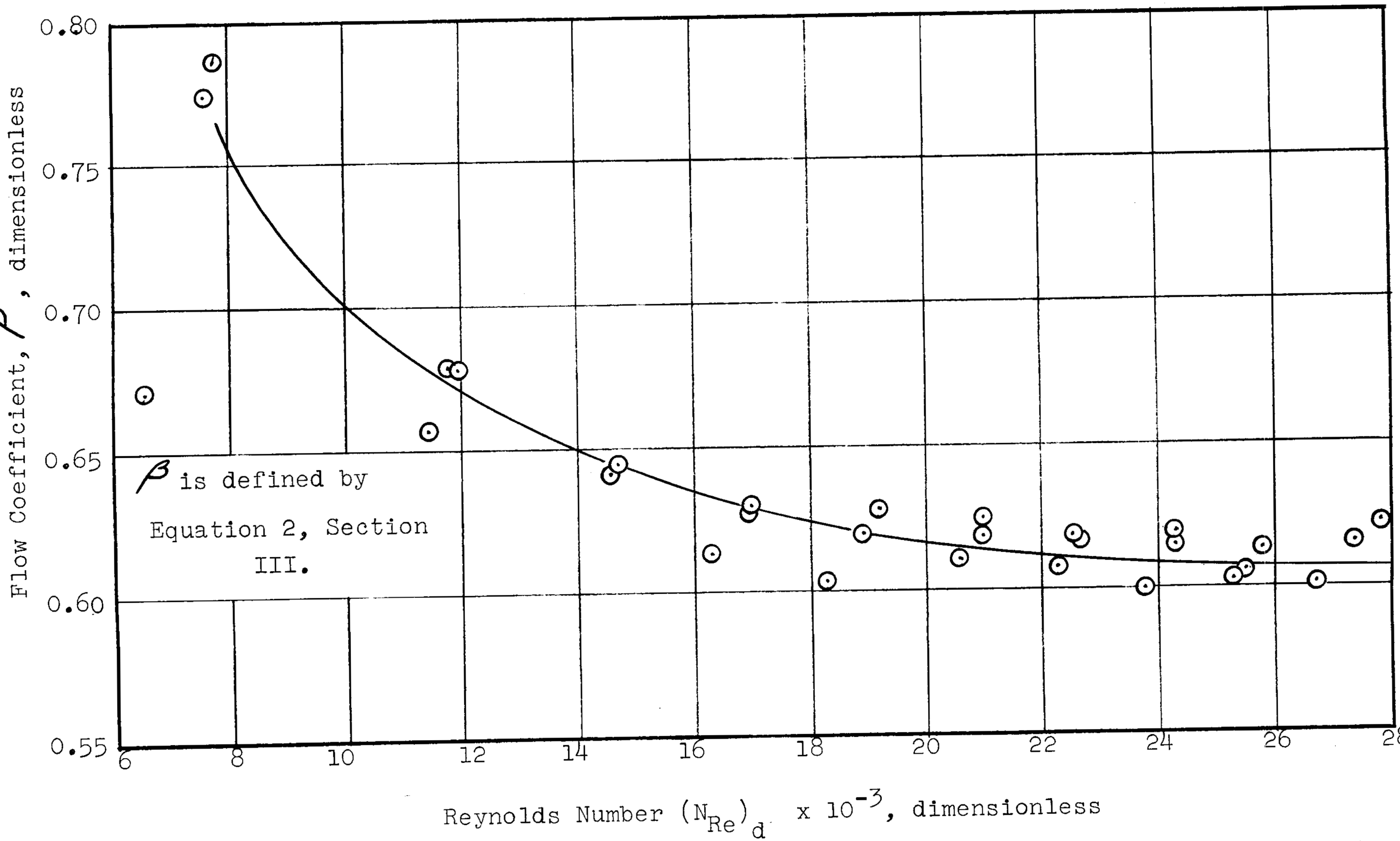


Figure 18. Flow Coefficient as a function of Reynolds number for the 100 KW Loop Orifice

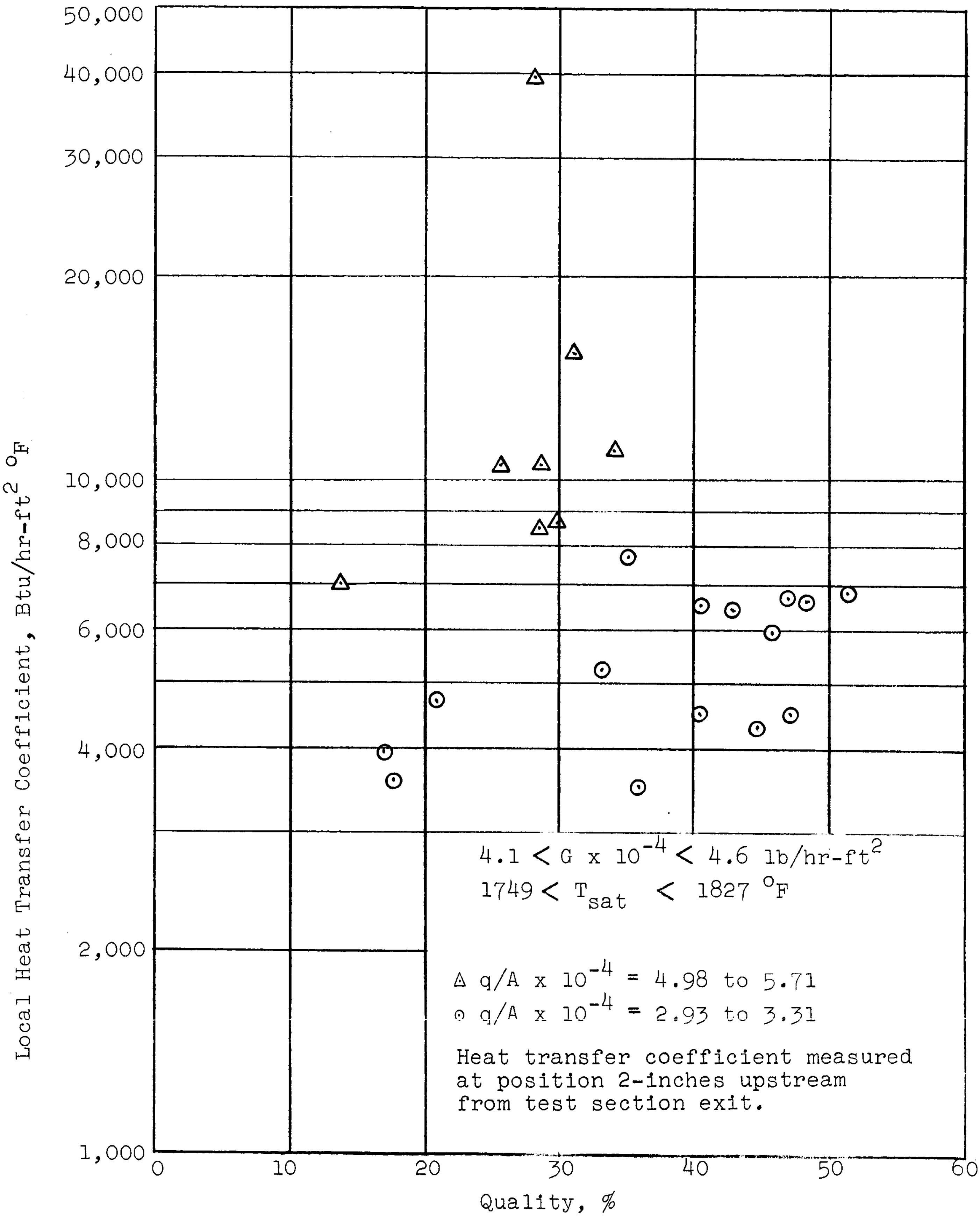


Figure 19. Potassium Boiling Heat Transfer Coefficients as a Function of Exit Quality (100 KW Loop)

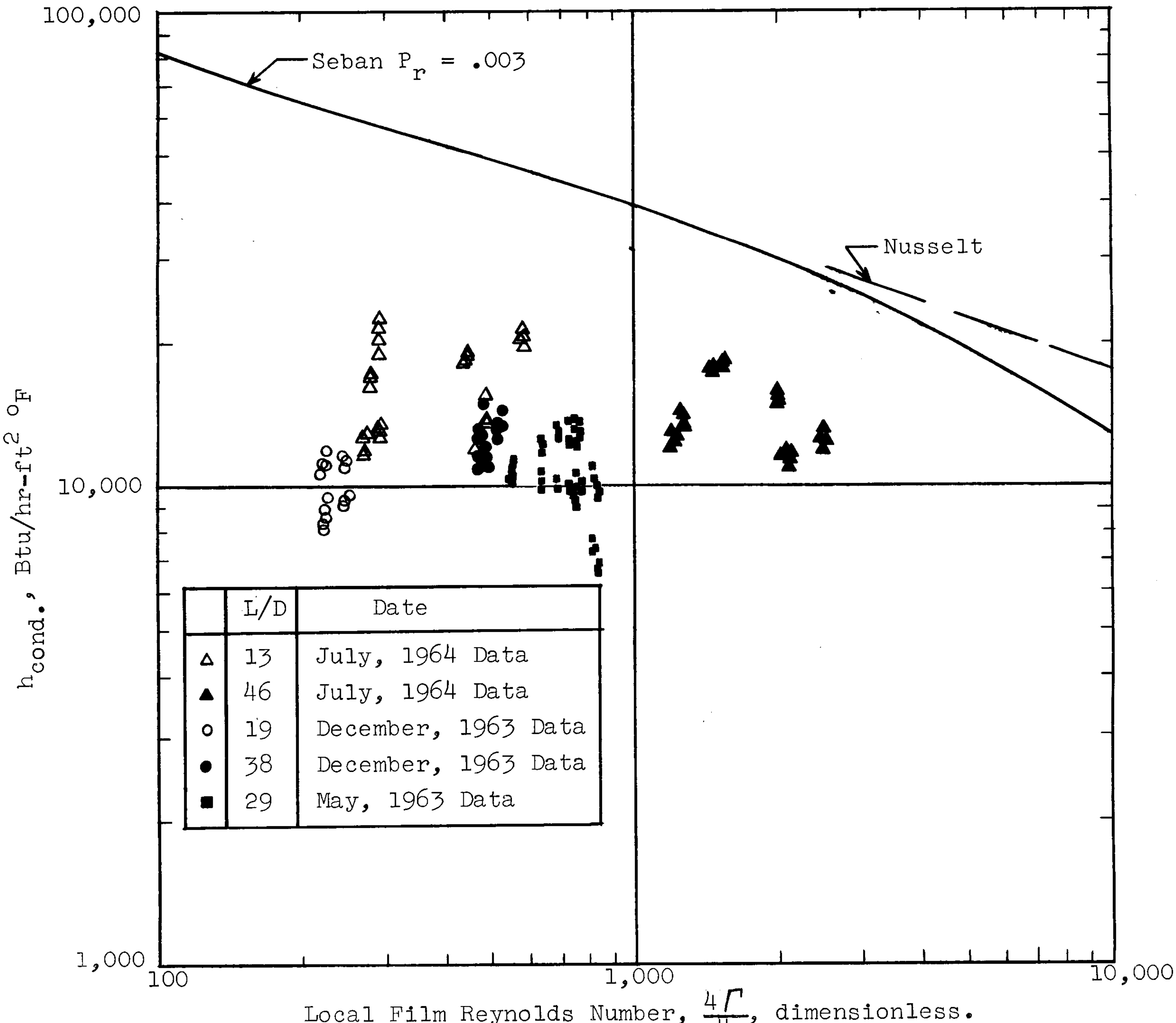


Figure 20. Local Condensing Heat Transfer Coefficient for Potassium Vapor (50 KW Facility)

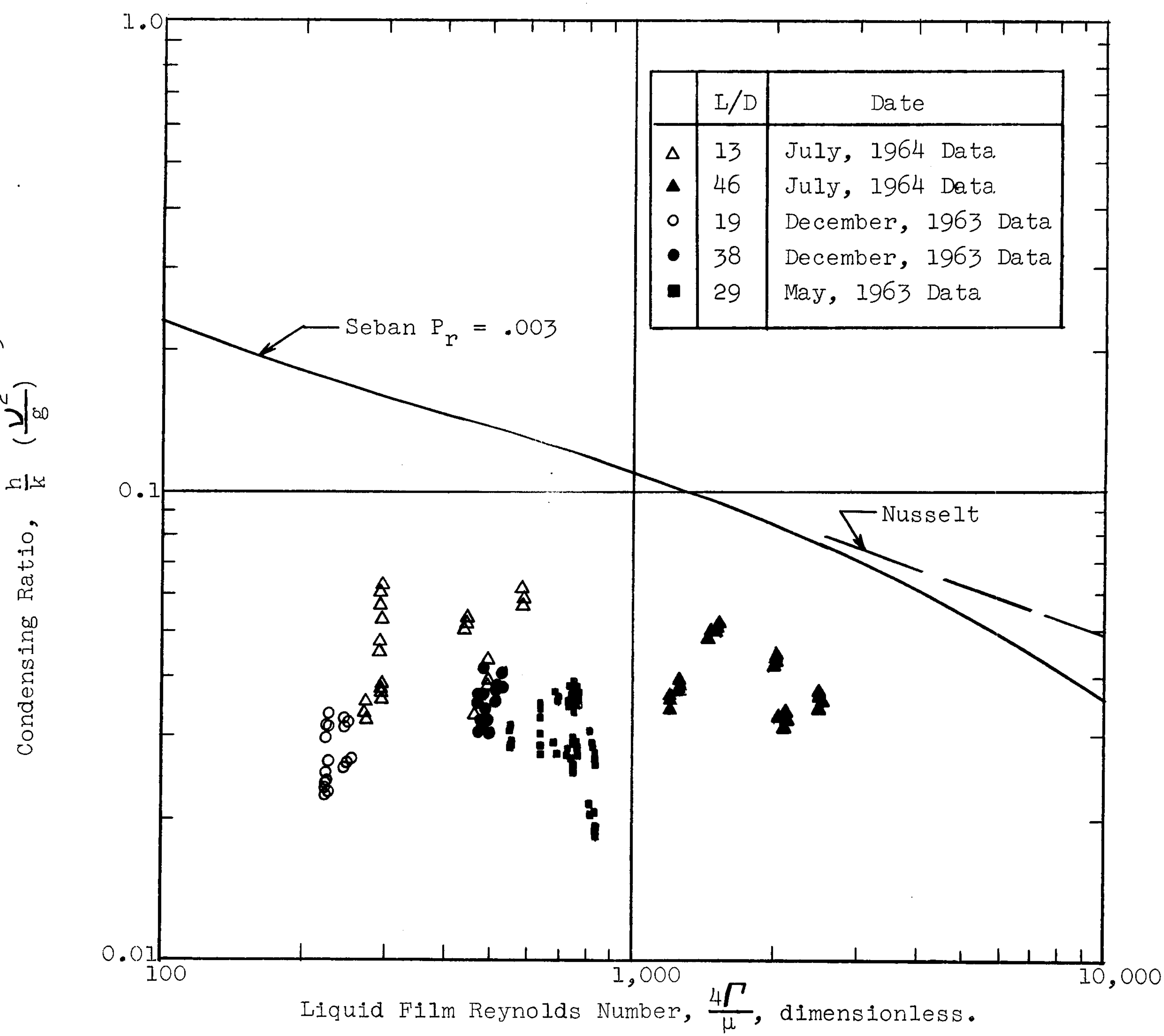


Figure 21. Local Condensing Heat Transfer Coefficients for Potassium Vapor (50 KW Facility)

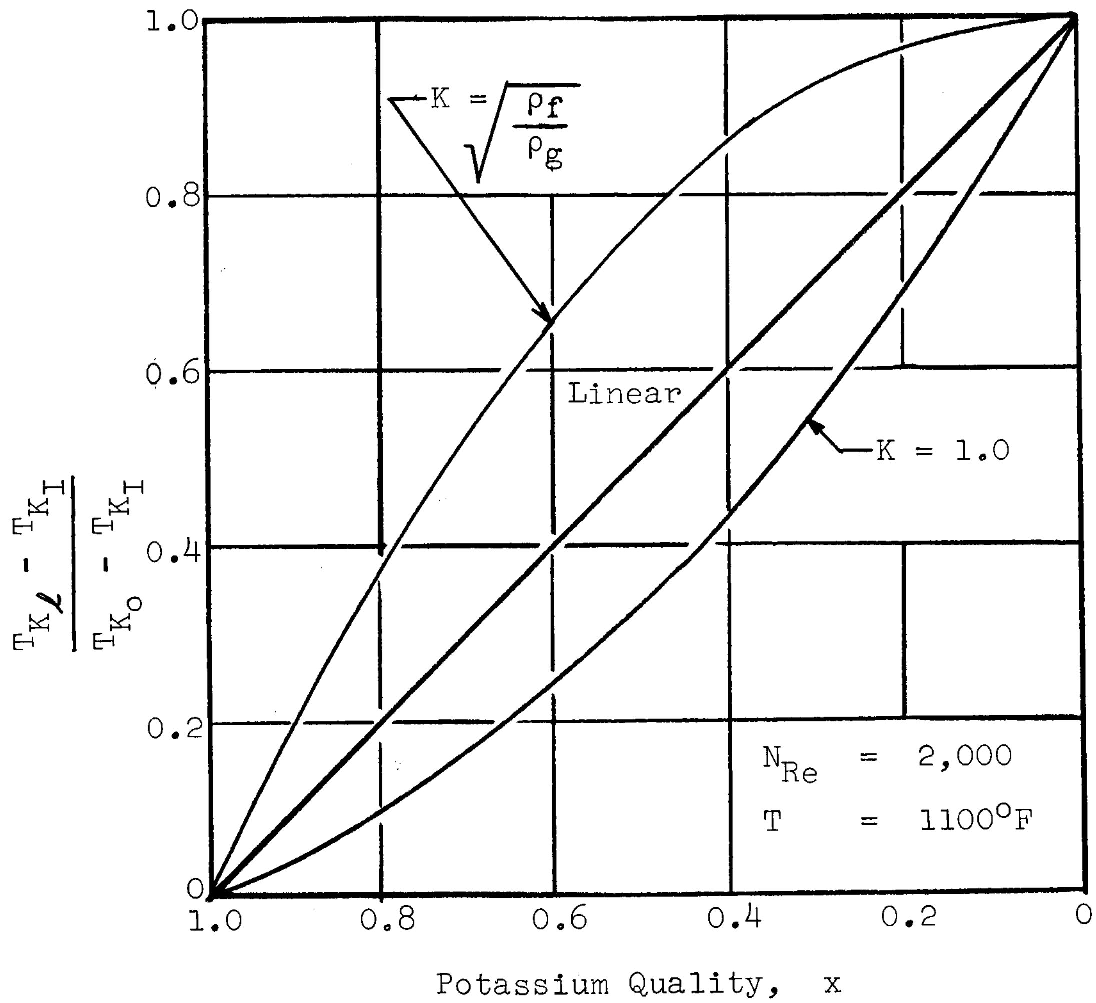


Figure 22 . Dimensionless Axial Temperature Distribution

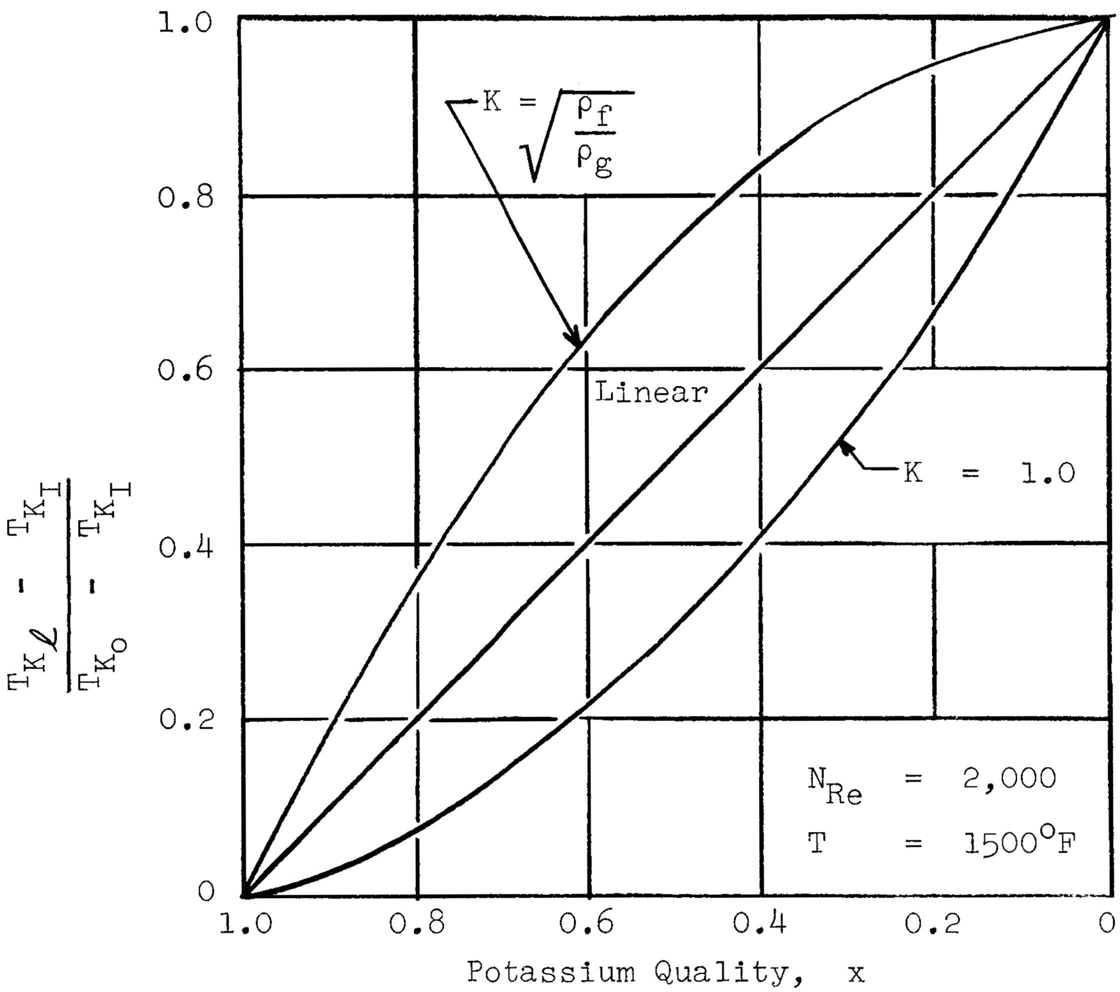


Figure 23. Dimensionless Axial Temperature Distribution

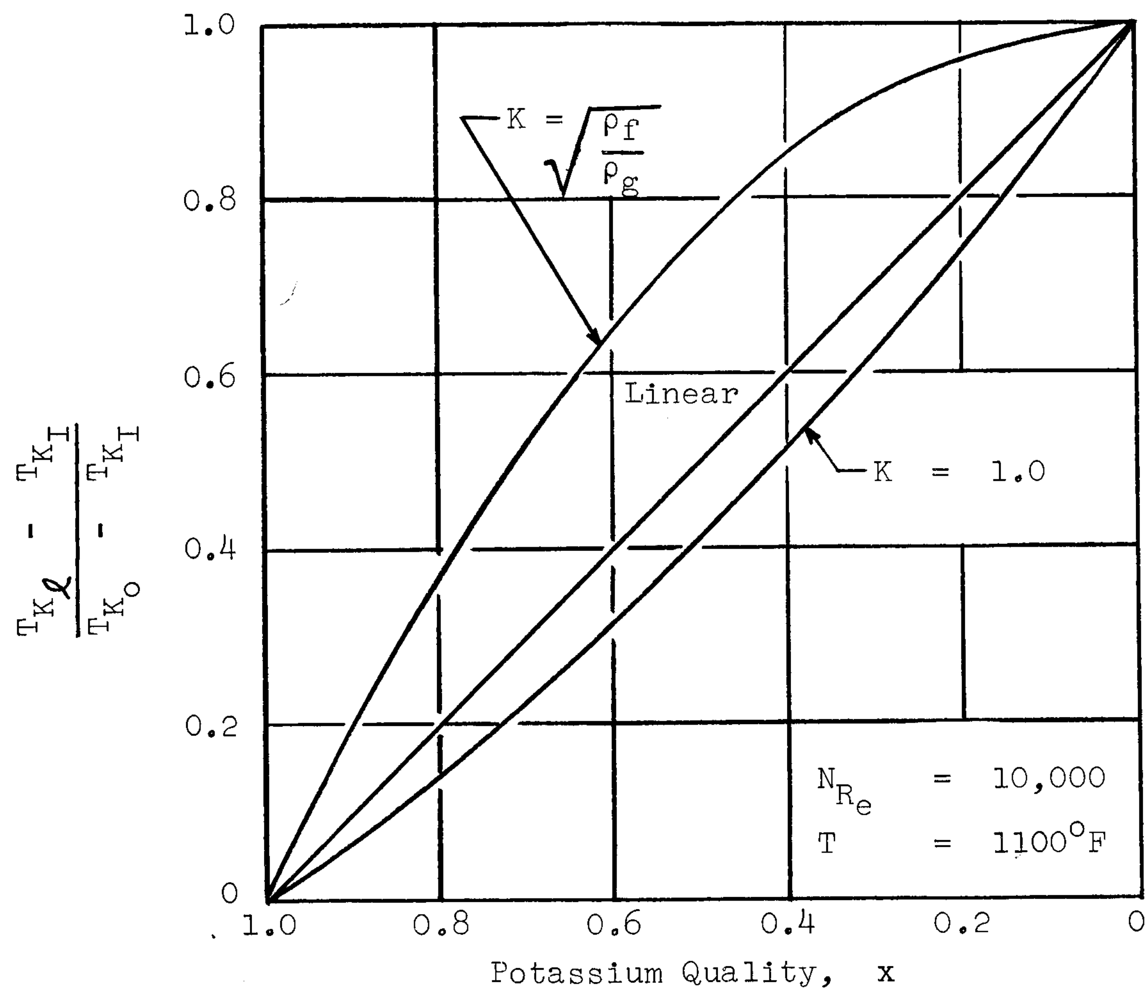


Figure 24 . Dimensionless Axial Temperature Distribution

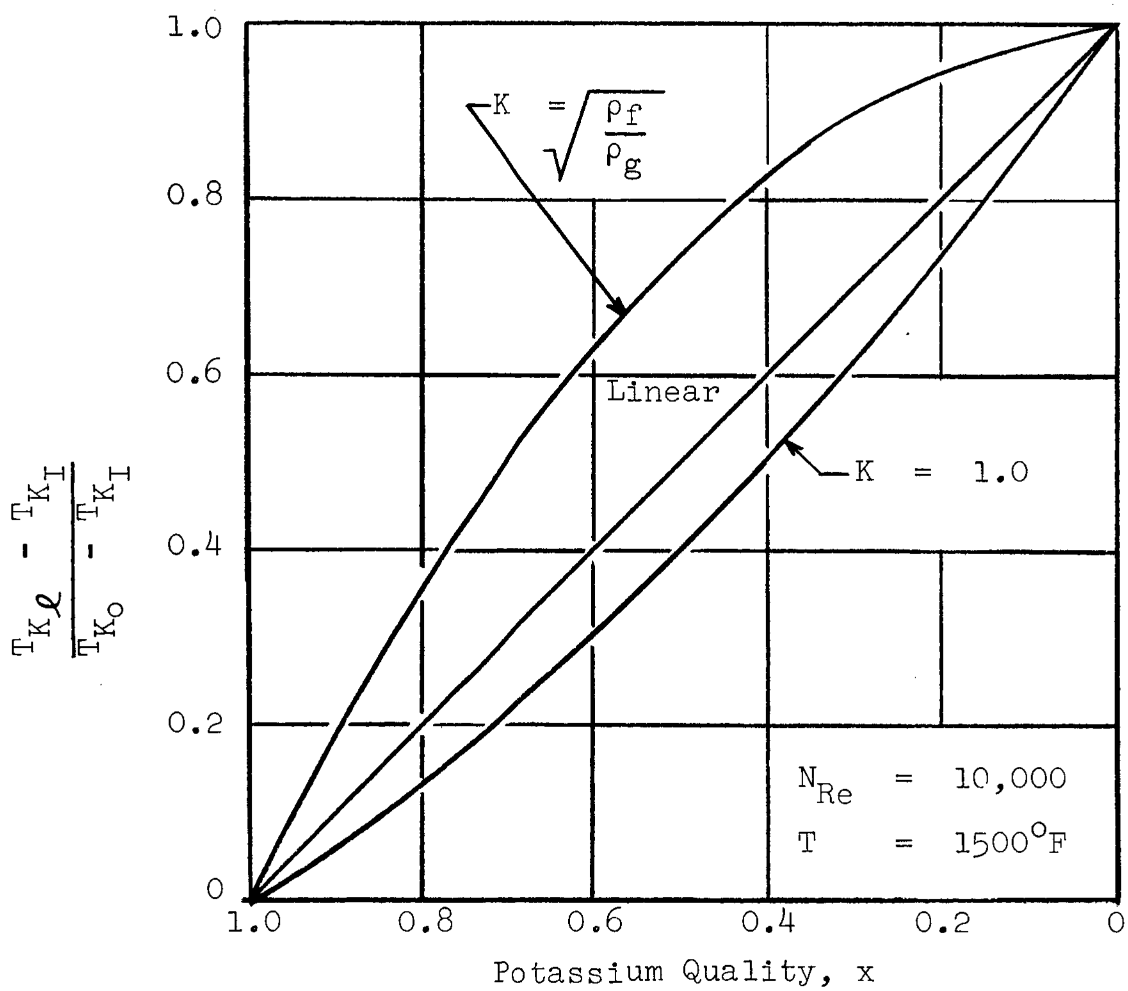


Figure 25. Dimensionless Axial Temperature Distribution

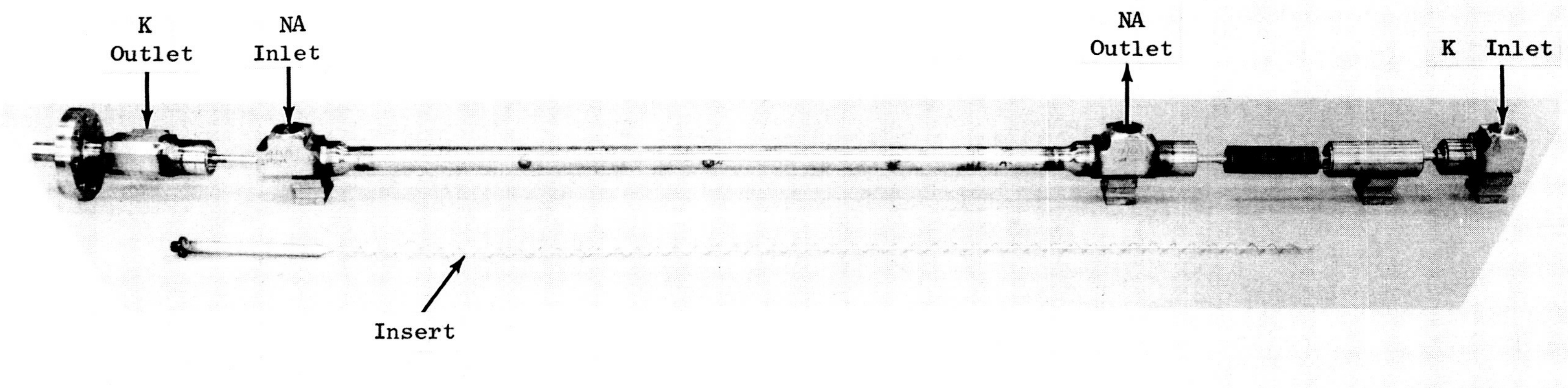


Figure 26. Photograph of 3/4" Tube L-605 Test Boiler with Helical Insert During Assembly- **300 KW Facility** (C-64090166)

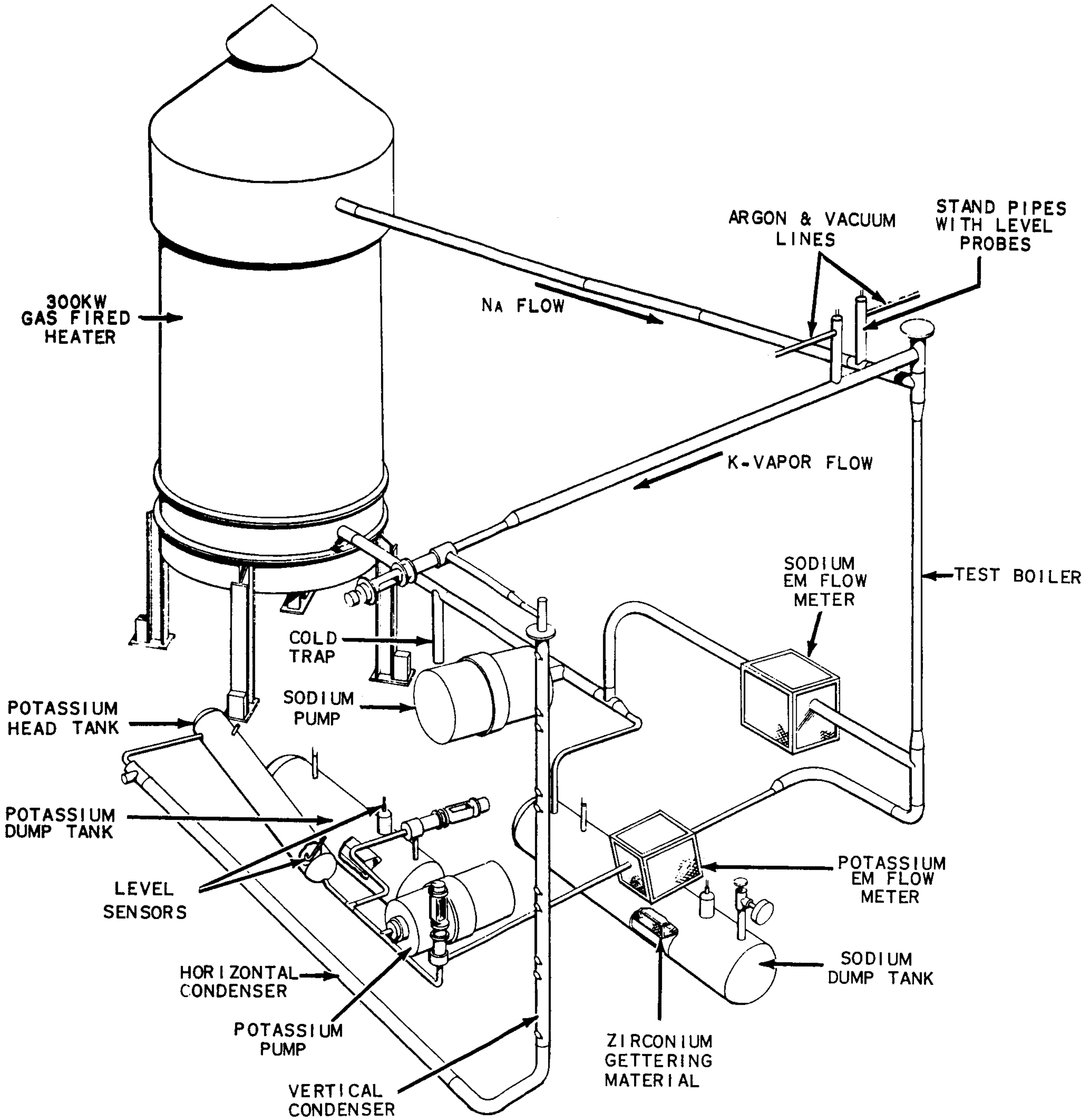


Figure 27. 300 KW Heat Transfer Facility

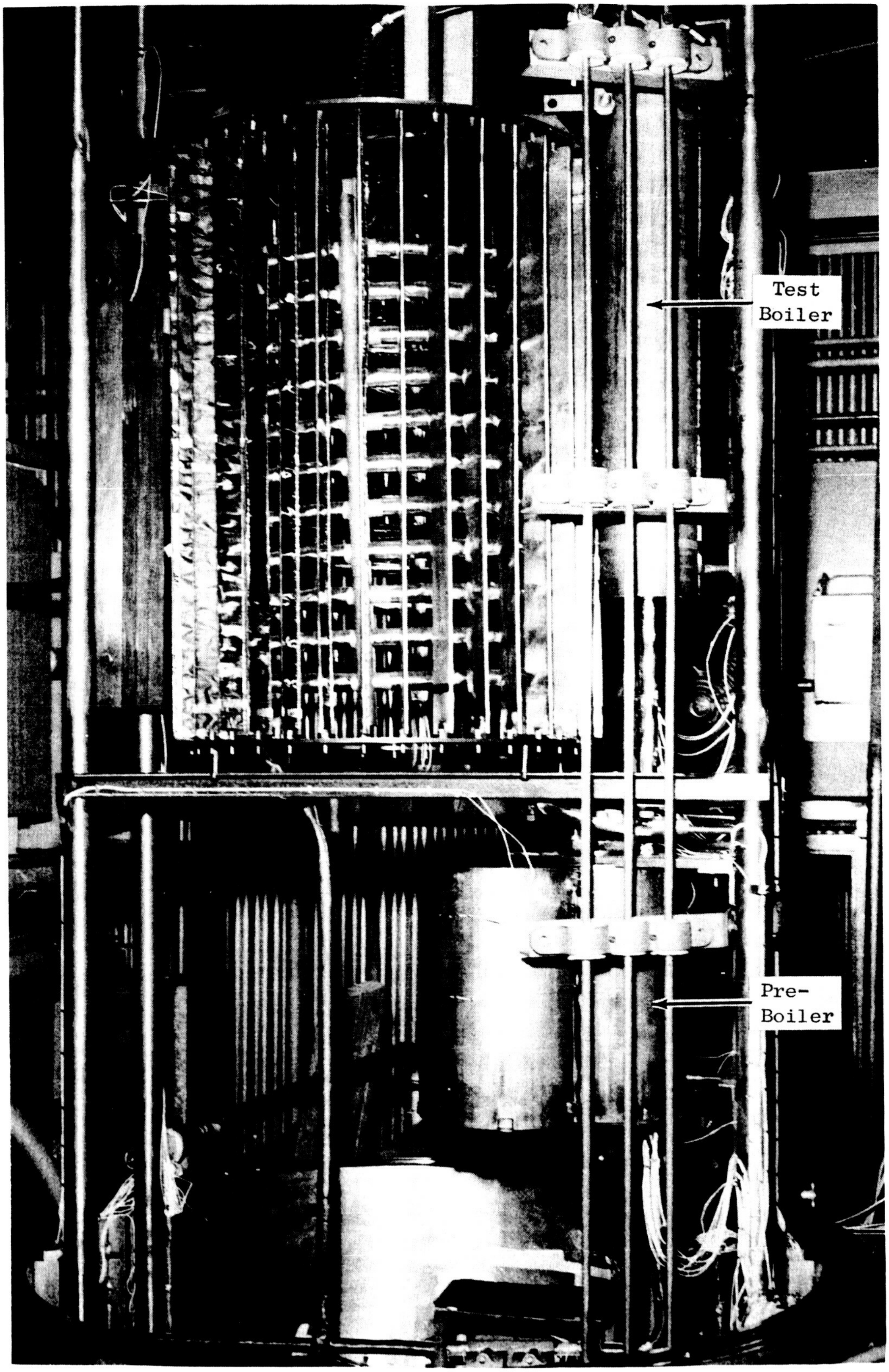


Figure 28. Photograph of 100 KW Loop Showing Installation of New Test Boiler and Preboiler (C-64081717)

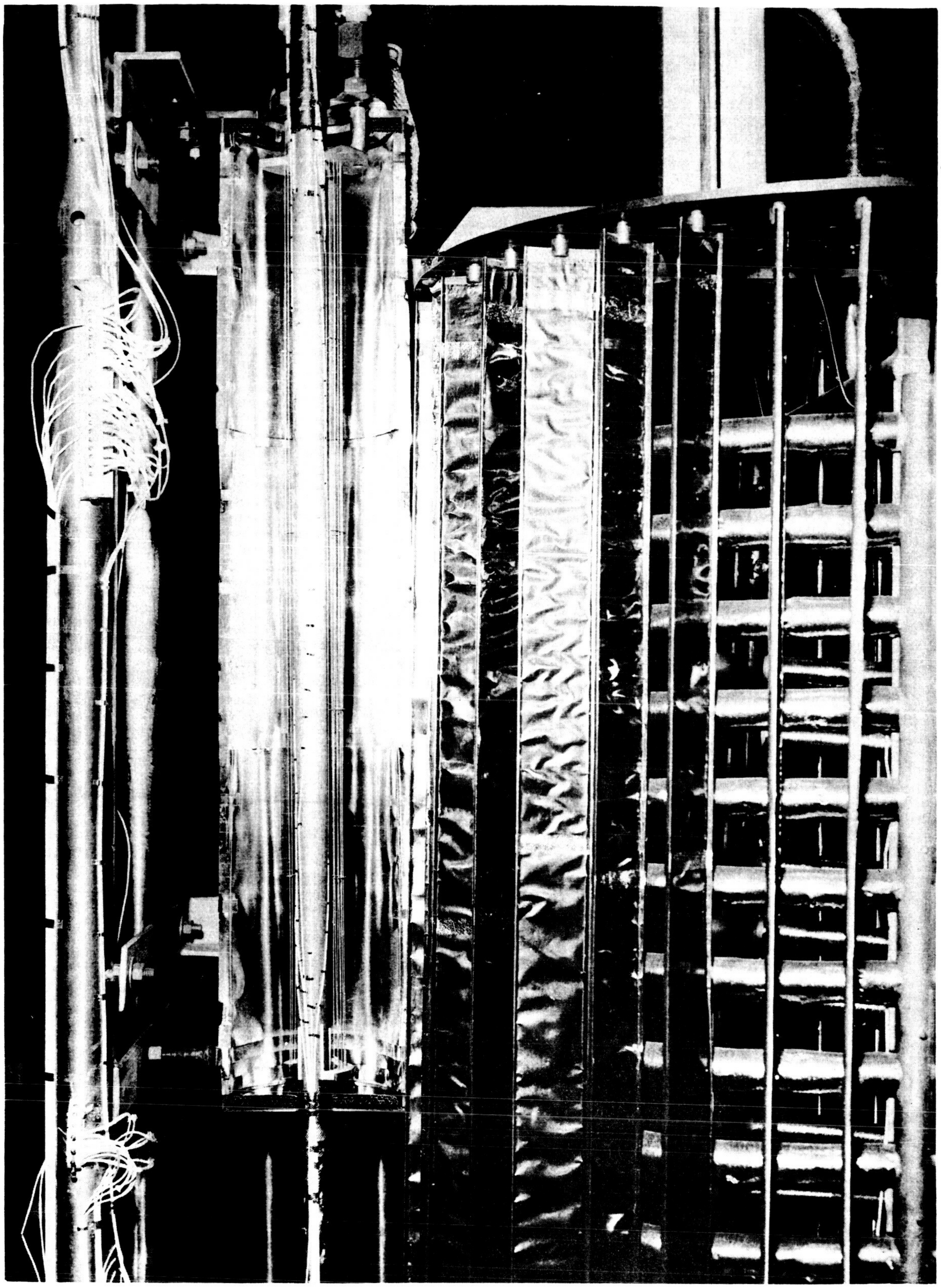


Figure 29. Photograph of 100 KW Loop Test Boiler Showing Boiler Tube Thermocouples, Tungsten Rod Radient Heater, and Tantalum Heat Shield (C-64081715)

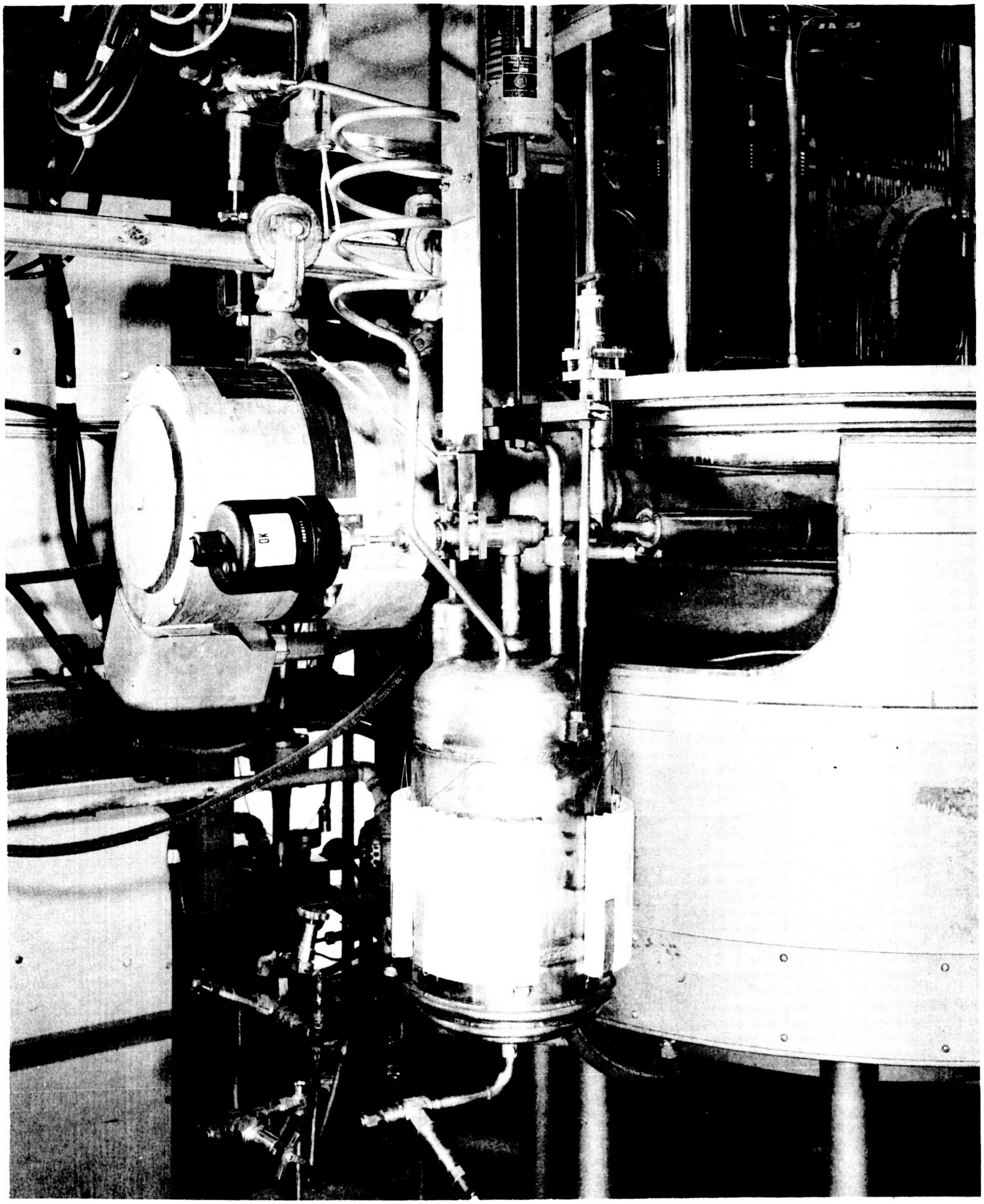


Figure 30. Photograph Showing New 100 KW Loop Dump Tank and Dump Valve Installation (C-64070113)

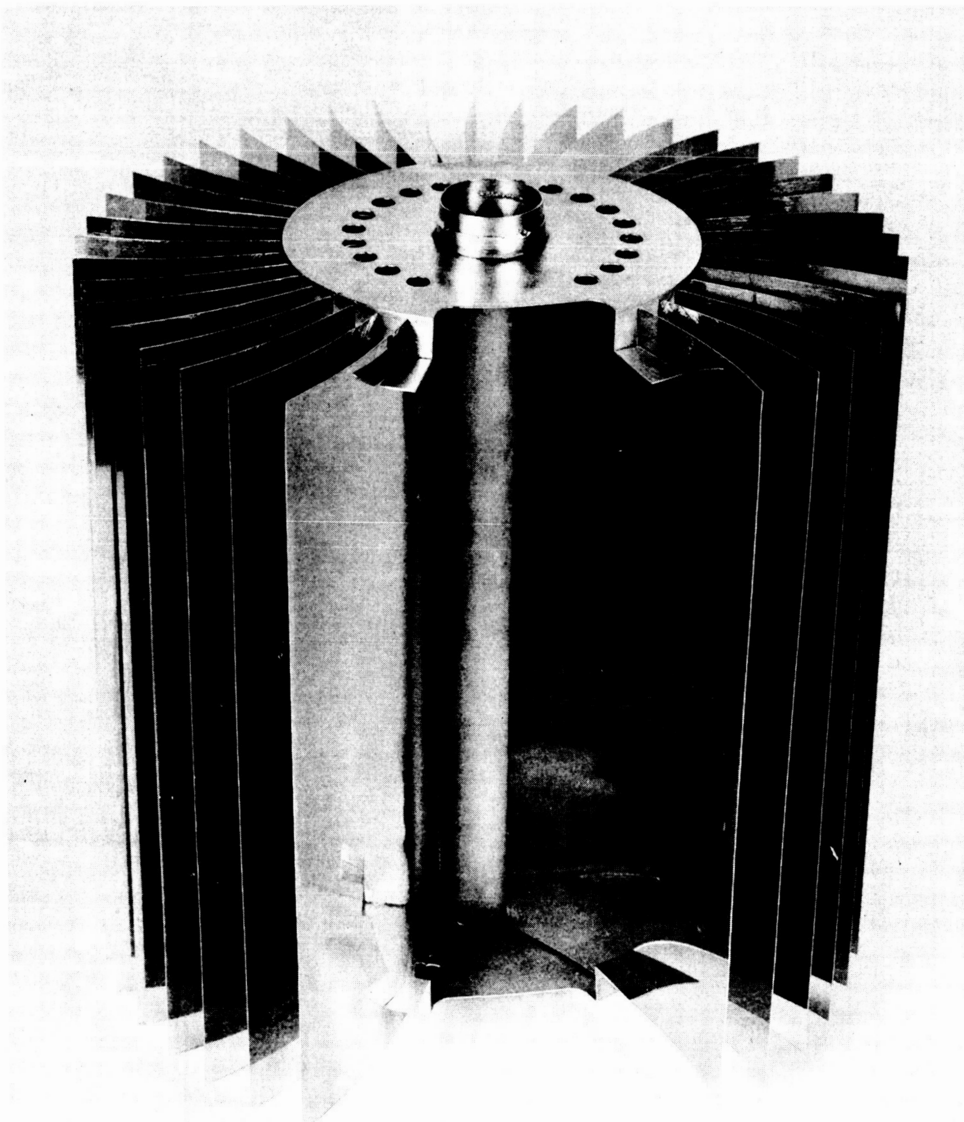


Figure 31. Photograph of Zirconium Gettering Assembly Installed in 100 KW Loop Dump Tank (C-64060312)

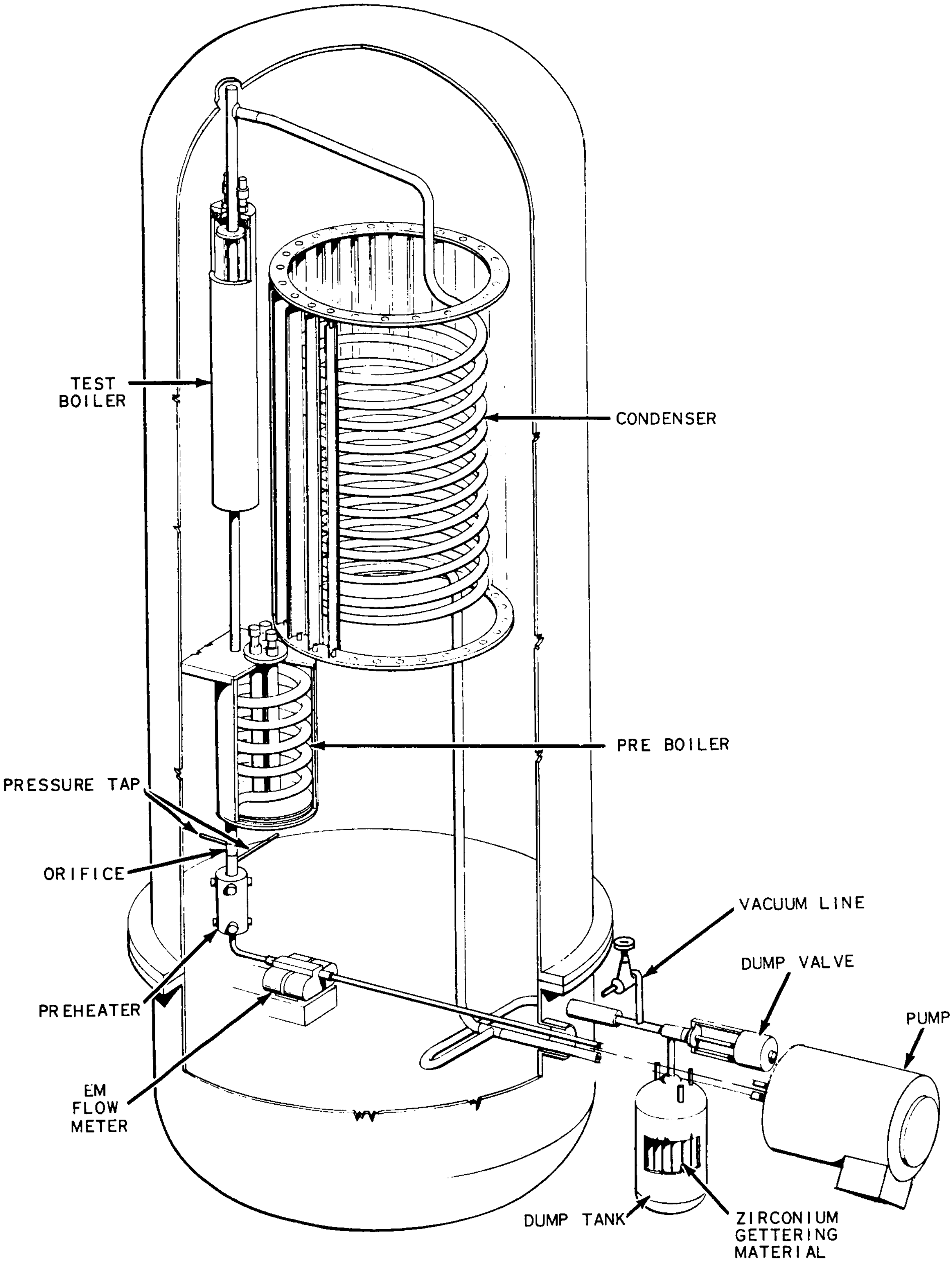


Figure 32. 100 KW Heat Transfer Facility

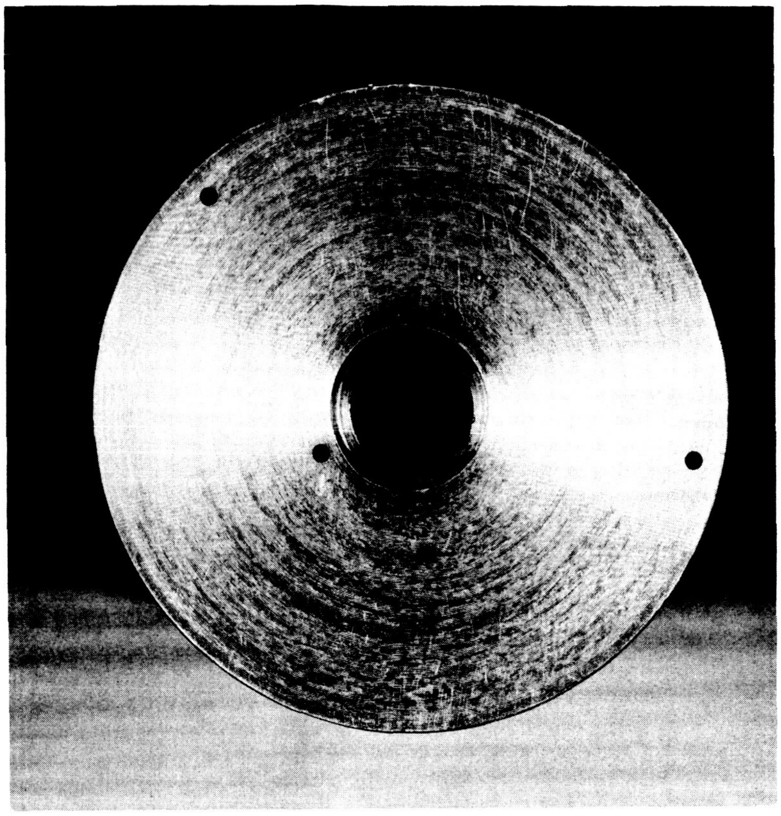


Figure 33. Photograph Showing End View of 50 KW Test Condenser Nickel Tube with Drilled Thermocouple Holes (C-64081220)

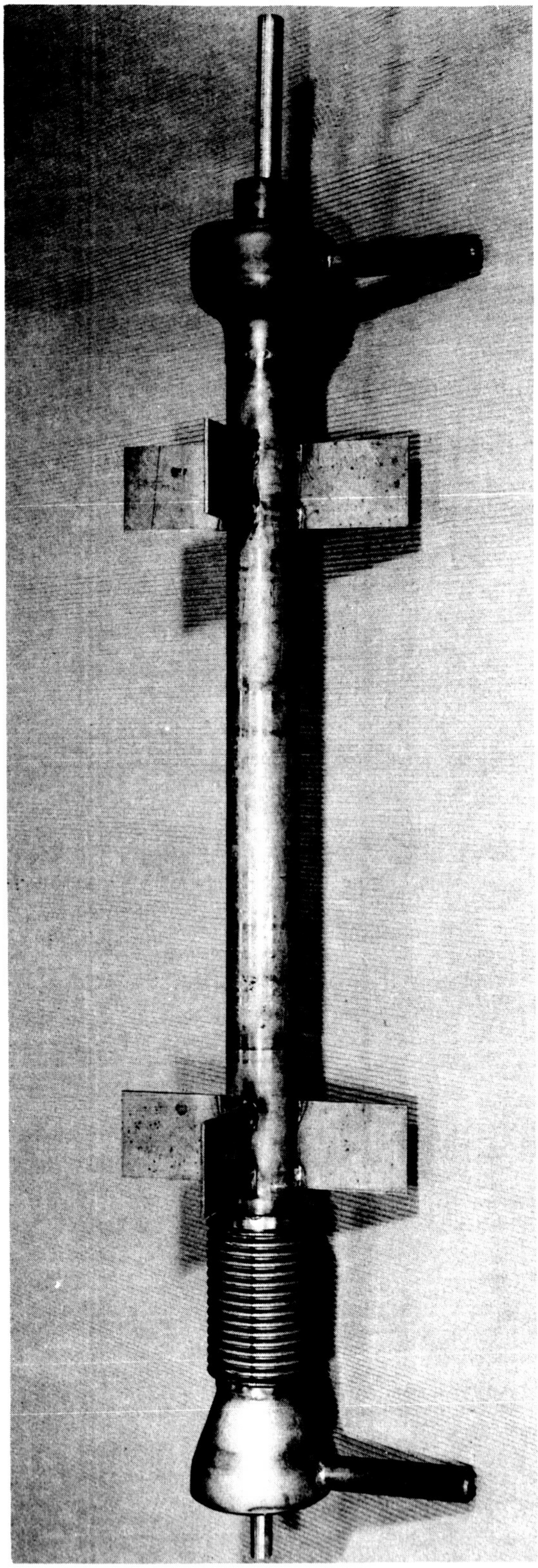


Figure 34. Photograph of 50 KW Test Condenser Assembly (C-64081221)

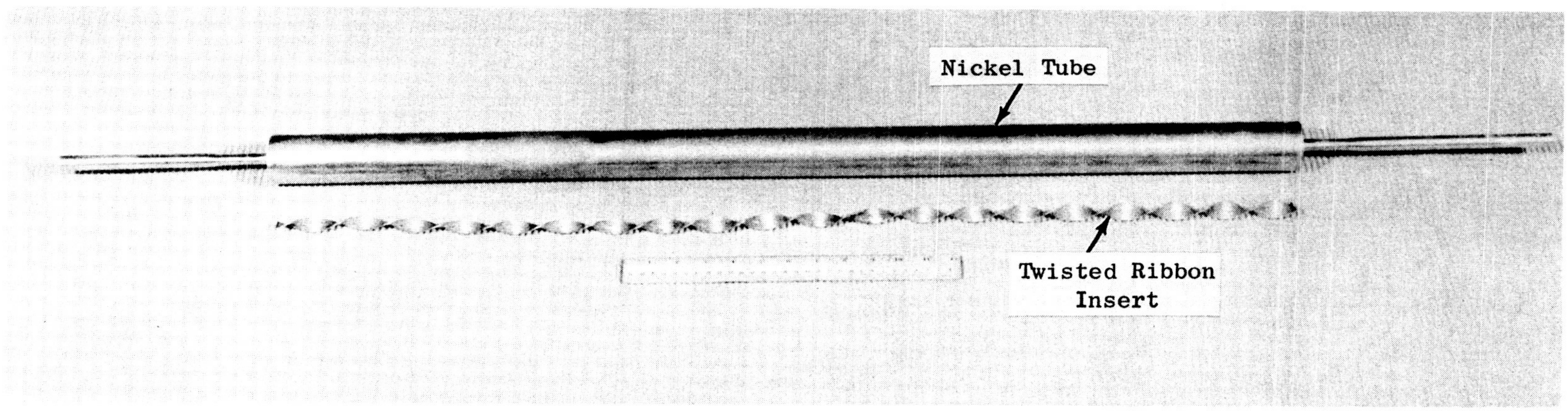


Figure 35. Photograph of 50 KW Nickel Condenser Tube and Twisted Ribbon Insert (C-64092105)

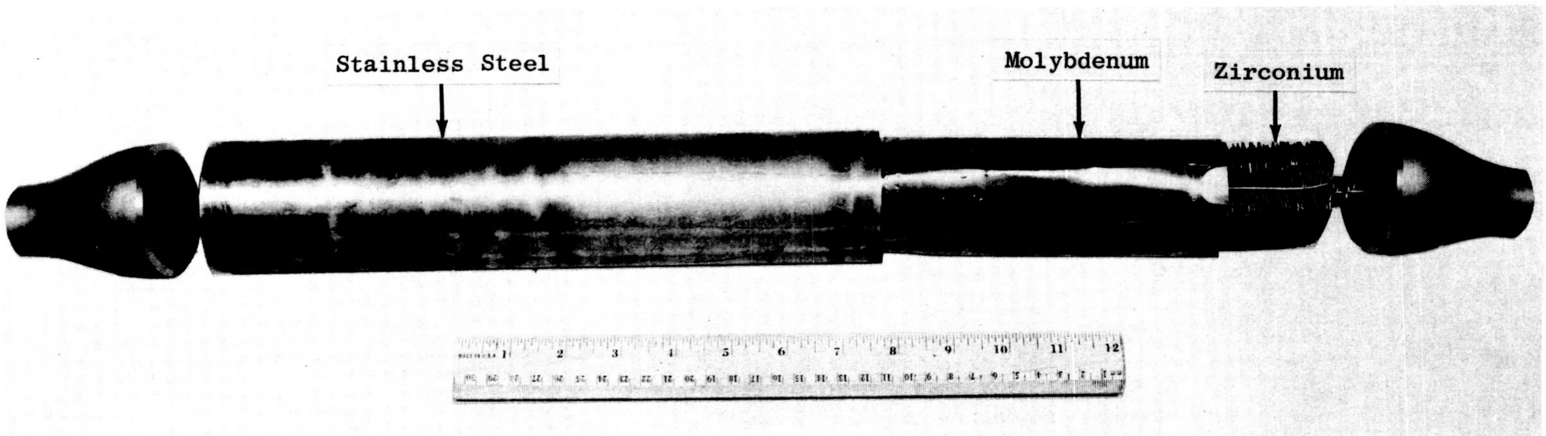


Figure 36. Photograph of Zirconium Hot Trap During Assembly Installed in 50 KW Potassium System (C-64092115)

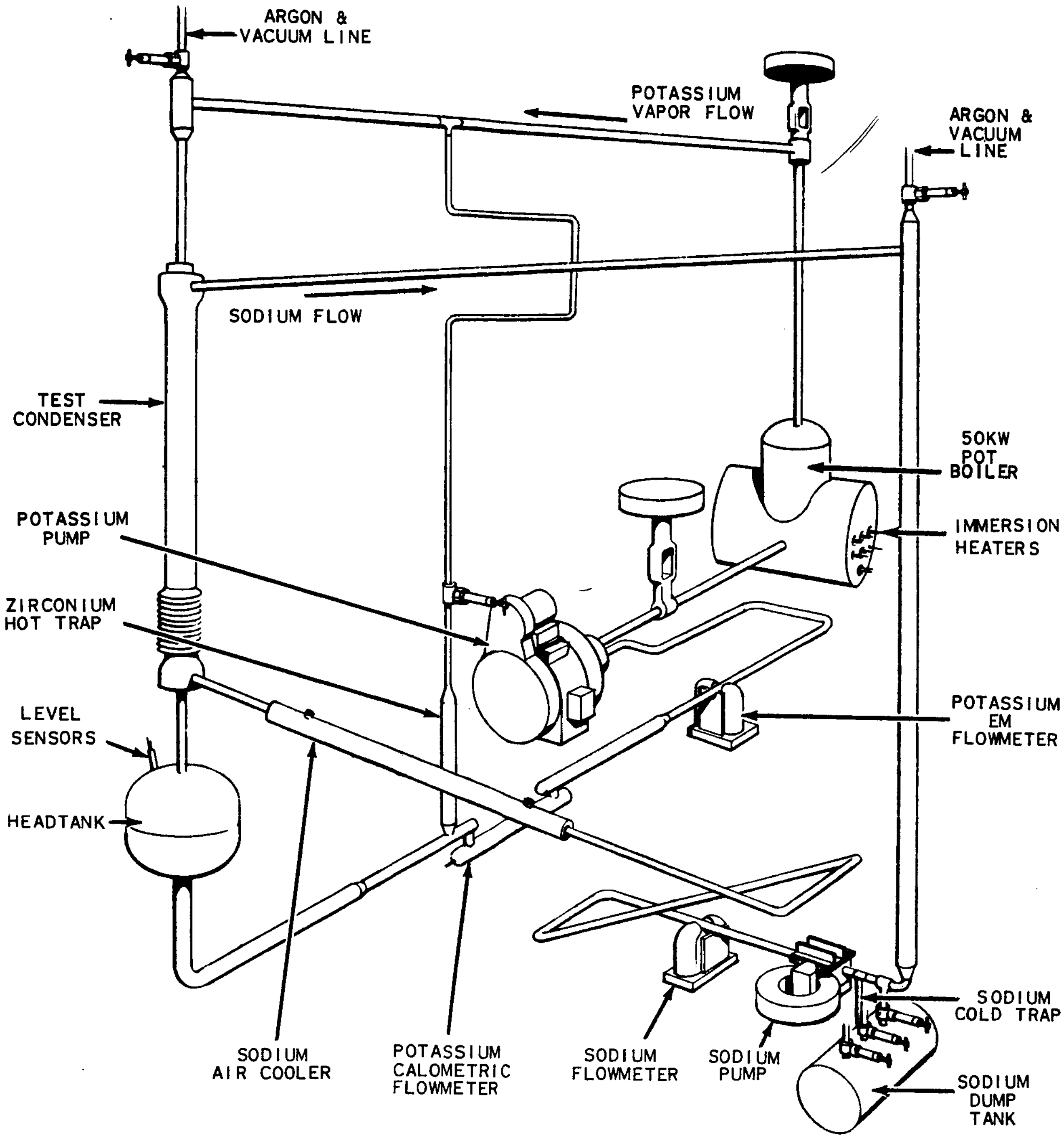


Figure 37. 50 KW Heat Transfer Facility

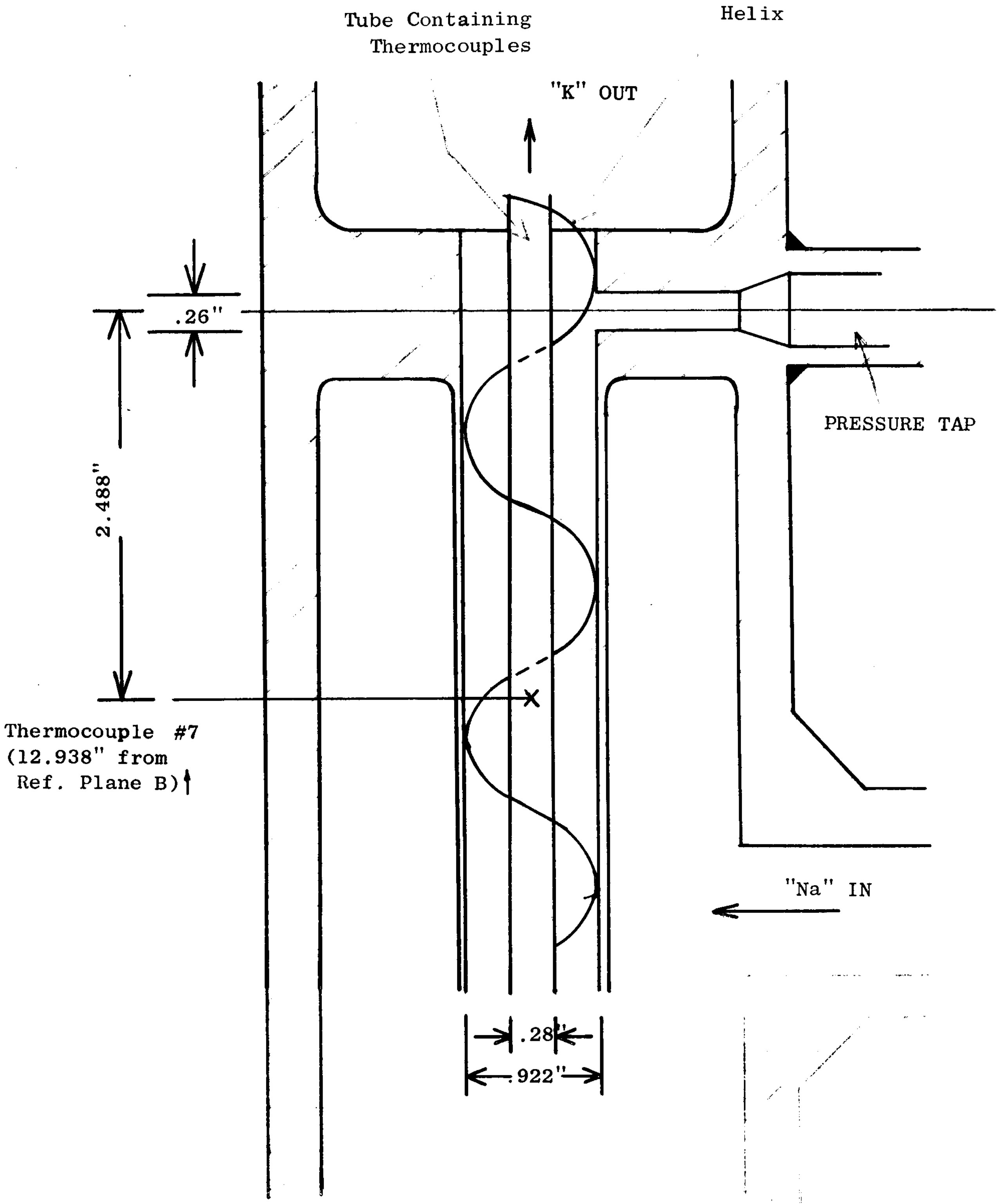


Figure 38. Test Geometry of Boiler Insert in 300 KW Facility

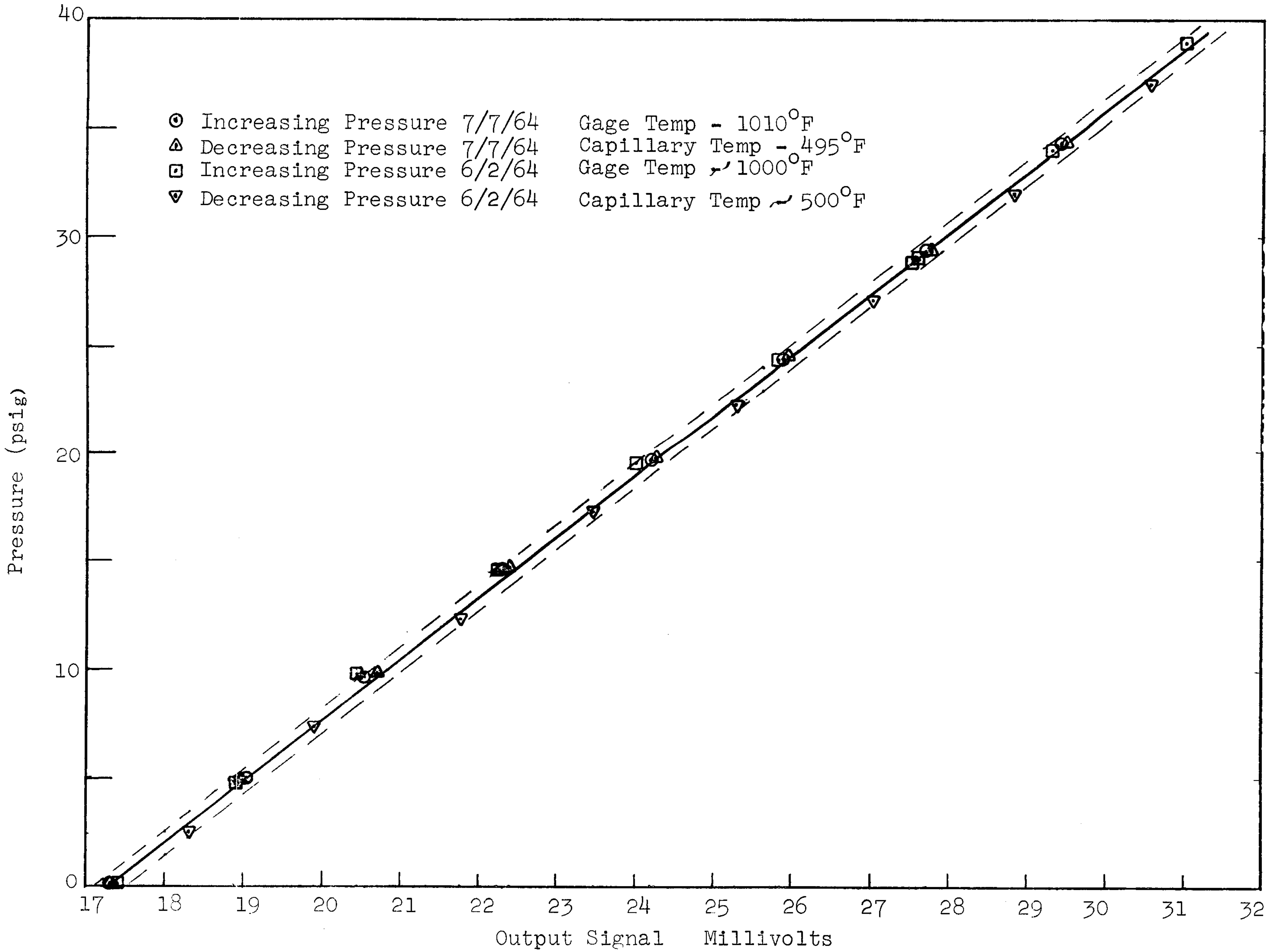


Figure 39. Pressure Gage Calibration (300 KW Loop)

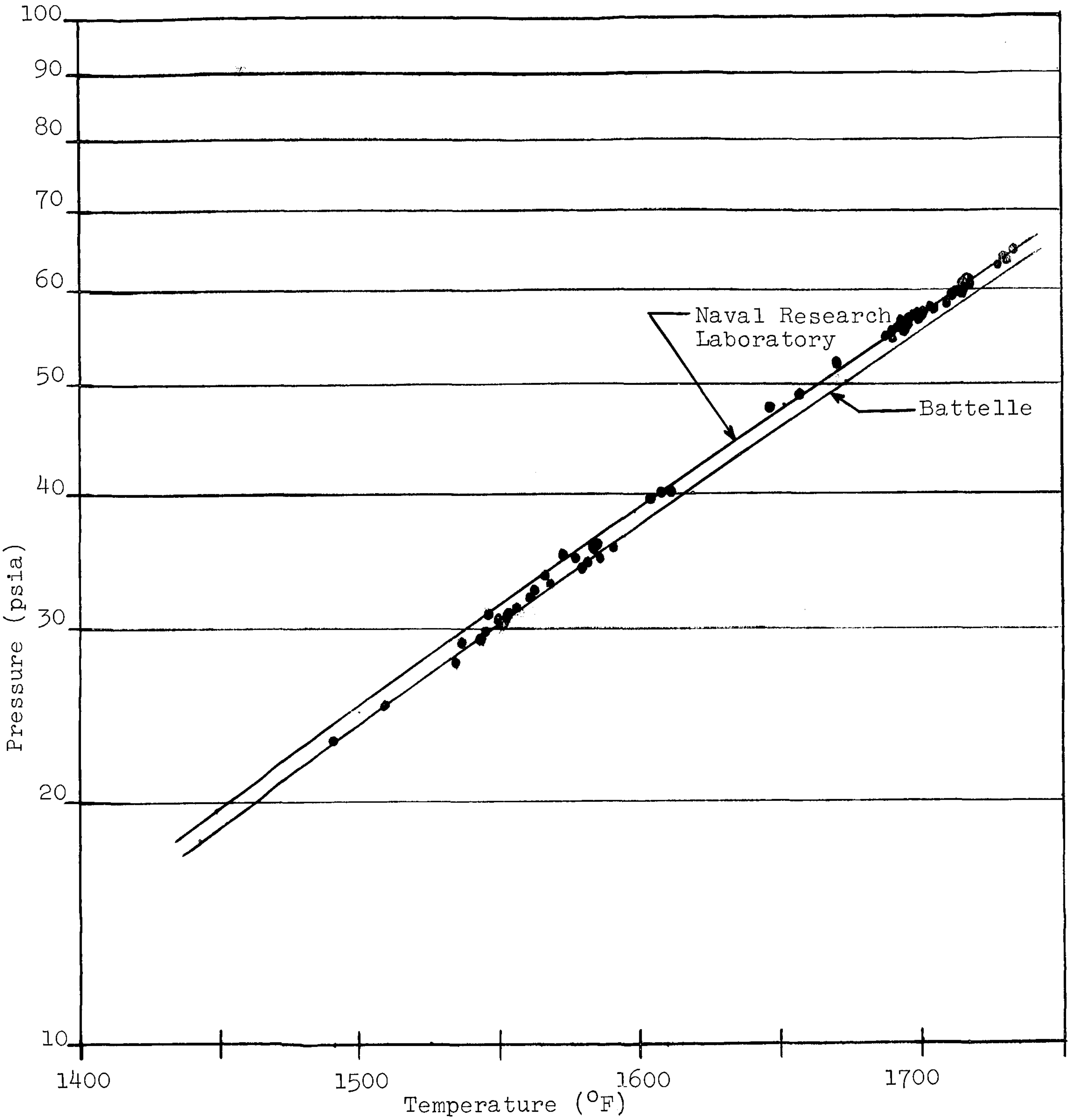


Figure 40. Saturation Curves for Potassium and Experimental Data from 300 KW Facility.

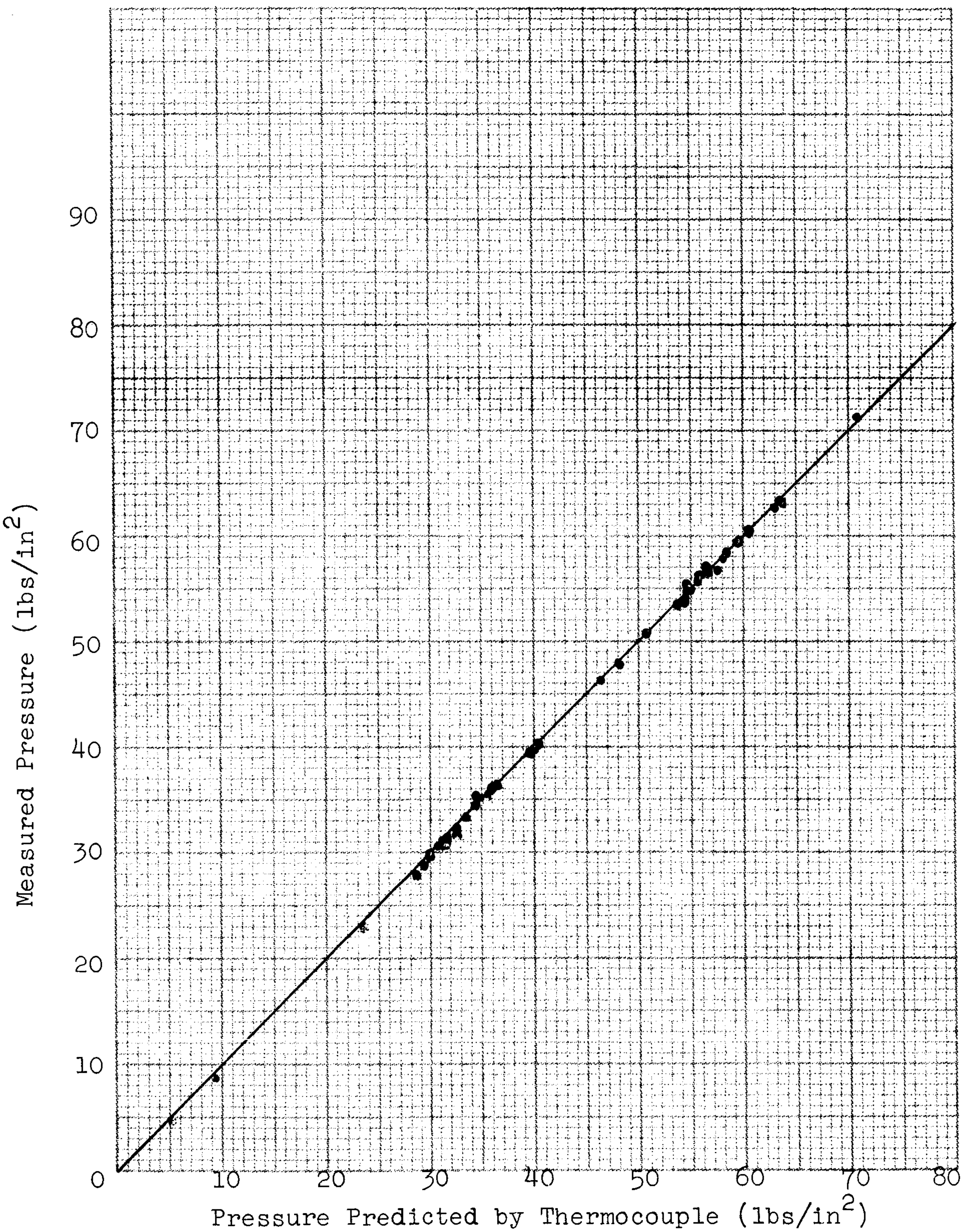


Figure 41. Measured Pressure vs Pressure Predicted from Thermocouple Measurements - 300 KW Facility.

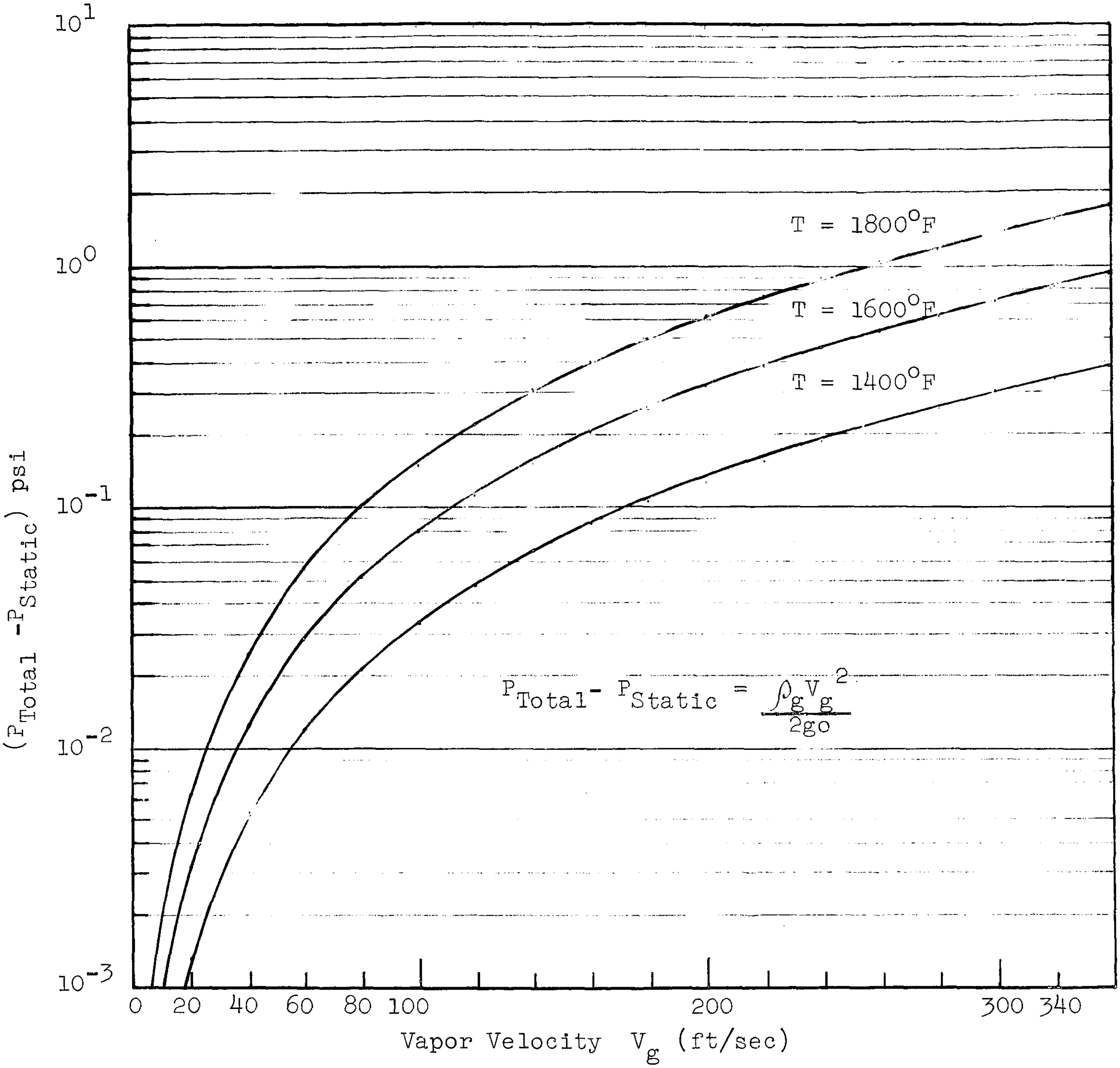


Figure 42. Total to Static Pressure Difference as a Function of Vapor Velocity.

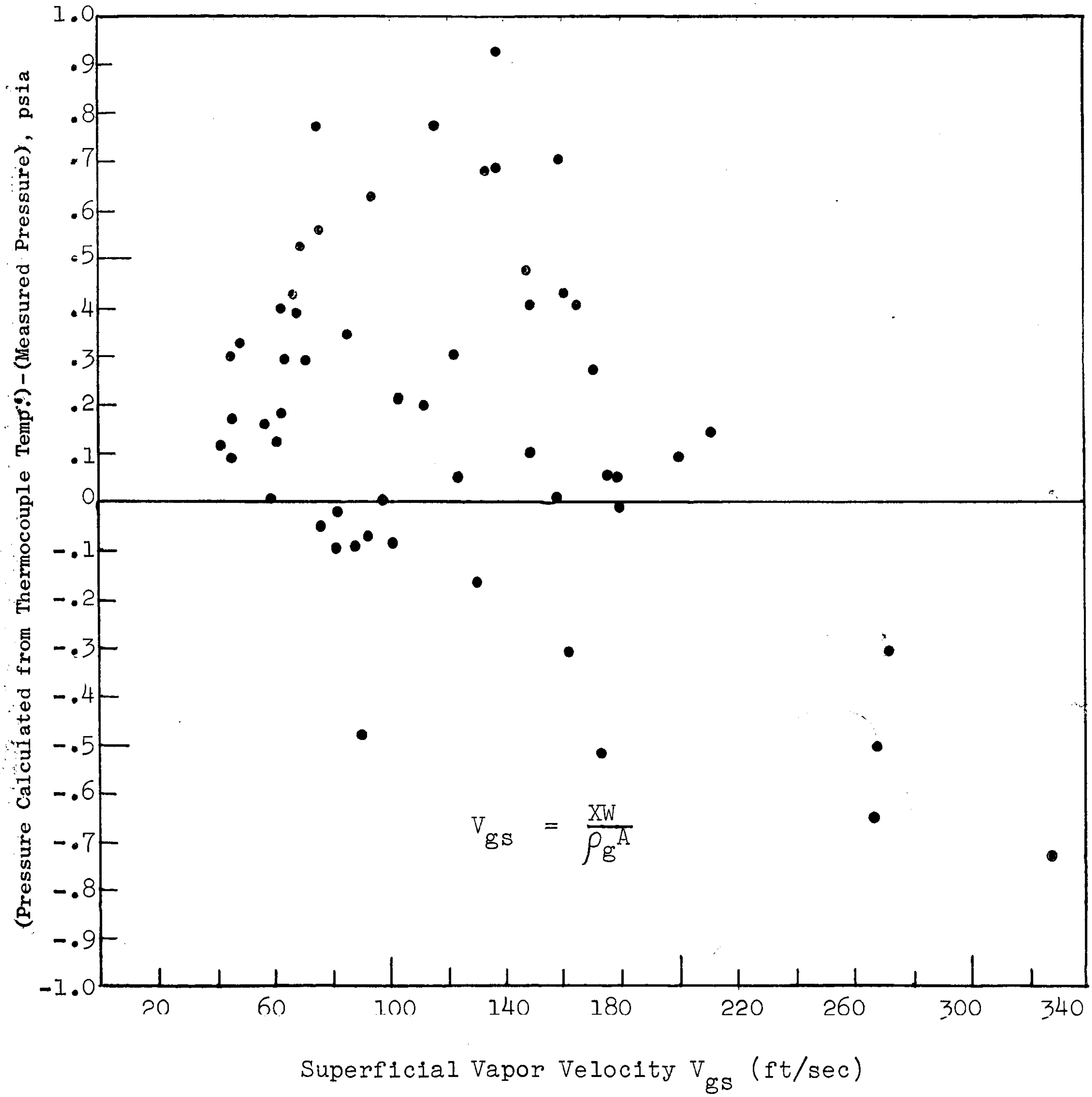


Figure 43. Difference Between Pressure as Determined from Thermocouple Measurements and Measured Static Pressure as a Function of Superficial Vapor Velocity (300 KW Facility).

APPENDIX A

Reduced 300 KW Data

TABLE A-1. NOMENCLATURE FOR 300 KW BOILING DATA

Some of the temperatures reported were derived from thermocouples with cold junctions in an ice bath, while others were derived from thermocouples with cold junctions at a CATS block. The former temperatures are identified by the subscript (I) as in POT-I.

Column No.	Title	Description
202	Date	5.194 - 5/19/64
203	Time	1445 - Navy time
860, 862,863	PIT-I	Primary inlet temperature, ^oF
861, 864,865	POT-I	Primary outlet temperature, ^oF
*800 - 859	BW	Boiler outer wall temperature, ^oF
	BW-A	Average boiler outer wall temperature at a given circumferential location, ^oF
866, 867	SIT-I	Secondary inlet temperature, ^oF
868, 869	SOT-I	Secondary outlet temperature, ^oF
*870 - 876	BI	Boiler insert thermocouple temperature, ^oF
217	BH	Boiler hanger thermocouple temperature, ^oF
211, 213,215	BB	Boiler bellows zone thermocouple temperature, ^oF
222	PIT-A	Average primary inlet temperature, ^oF
225	POT-A	Average primary outlet temperature, ^oF
228	SIT-A	Average secondary inlet temperature, ^oF
230	SOT-A	Average secondary outlet temperature, ^oF
233	PFMST	Primary flowmeter stream temperature, ^oF
235	PFMMT	Primary flowmeter magnet temperature, ^oF
**237	SFMST	Secondary flowmeter stream temperature, ^oF
239	SFMMT	Secondary flowmeter magnet temperature, ^oF
243	PFLO	Primary flowrate, lb/sec.
247	SFLO	Secondary flowrate, lb/sec
249	G-NA	Sodium mass velocity, lb/ft^2hr.
251	G-K	Potassium mass velocity, lb/ft^2hr.
255	BOP	Pressure at boiler outlet, psia
258	VPKO	Vapor pressure of potassium at SOT-A, psia
270	BIP-C	Boiler inlet pressure, psia, corrected for liquid head
271	DPB-G	(BIP-C) - (BOP)

*The numbers following BW and BI (such as BW 23) indicate the distance of the particular thermocouple from boiler Reference Plane B. The reference plane and all other instrument locations not discussed herein are presented in Reference 4.

**The secondary flowmeter stream temperature thermocouple was inoperative during these tests. The temperature reported is the secondary boiler inlet temperature.

Column No.	Title	Description
272	TSATKI	Saturation temperature of potassium at boiler inlet pressure, ^{o}F
279	QL	Boiler heat losses, Btu/sec
284	QPRI	Net heat transferred from primary stream in boiler, Btu/sec
286	QFLUX	Average heat flux in boiler based on inner area, Btu/hr-ft^2
287	DT-SC	Subcooling of potassium at entrance to boiler, ^{o}F
291	QSC	Heat necessary to raise the potassium temperature from SIT to TSATKI, Btu/sec
703	QUAL-B	Vapor quality, dimensionless
707	VVEL-B	Superficial vapor velocity at boiler exit, ft/sec
713, 715	VCIT-I	Vertical condenser inlet temperature, ^{o}F
717	VCIT-A	Average vertical condenser inlet temperature, ^{o}F
721, 722,	VCOT-I	Vertical condenser outlet temperature, ^{o}F
724	VCOT-A	Average vertical condenser outlet temperature, ^{o}F
727	VP VCI	Vapor pressure at vertical condenser inlet, psia
730	DPVC	Pressure drop across vertical condenser, psi
732, 733	HCOT-I	Horizontal condenser outlet temperature, ^{o}F
735	HCOT-A	Average horizontal condenser outlet temperature, ^{o}F
737, 739	HCAIT	Horizontal condenser air inlet temperature, ^{o}F
741	HCAITA	Average horizontal condenser air inlet temperature, ^{o}F
746	HCAOTS	Horizontal condenser air
747	HCAOT-NE	outlet temperature (south,
748	HCAOTN	northeast, north), ^{o}F.
749	HCAOTH	Horizontal condenser air outlet temperature (at hood), ^{o}F
751	HCAOTA	Average horizontal condenser air outlet temperature, ^{o}F
755, 756, 757	HCCAOT	Horizontal condenser cooling air outlet temp., ^{o}F
759	HCCAOA	Average horizontal condenser cooling air outlet temperature, ^{o}F
766	WA	Mass flow rate of air in horizontal condenser, lb/sec
770	QA	Heat removed in horizontal condenser, Btu/sec
777	DTLMHC	Logarithmic average of temperature difference across horizontal condenser
779	UOHC	Overall heat transfer coefficient of horizontal condenser

TABLE A-2

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	202	203	860	861	862	863
	DATE	TIME	PIT-I	POT-I	PIT-I	PIT-I
1	5.1940+00	1.4450+03	1.2253+03	1.2187+03	1.2256+03	1.2255+03
2	5.1940+00	2.2150+03	1.4041+03	1.3878+03	1.4030+03	1.4028+03
3	5.2040+00	9.0000+02	1.5850+03	1.5694+03	1.5830+03	1.5828+03
4	5.2040+00	2.2000+03	1.8256+03	1.8068+03	1.8247+03	1.8243+03
5	5.2140+00	5.2800+02	1.8411+03	1.8059+03	1.8404+03	1.8402+03
6	5.2140+00	7.0000+02	1.8503+03	1.8175+03	1.8499+03	1.8498+03
7	5.2140+00	9.3000+02	1.8134+03	1.7861+03	1.8127+03	1.8126+03
8	5.2140+00	1.3000+03	1.7969+03	1.7772+03	1.7964+03	1.7963+03
9	5.2140+00	1.7300+03	1.7757+03	1.7617+03	1.7755+03	1.7752+03
10	5.2140+00	1.9000+03	1.7612+03	1.7421+03	1.7608+03	1.7607+03
11	5.2140+00	2.0000+03	1.7625+03	1.7427+03	1.7620+03	1.7618+03
12	5.2140+00	2.1000+03	1.7661+03	1.7464+03	1.7660+03	1.7653+03
13	5.2140+00	2.2000+03	1.7645+03	1.7443+03	1.7641+03	1.7637+03
14	5.2140+00	2.3000+03	1.7677+03	1.7473+03	1.7669+03	1.7667+03
15	5.2140+00	2.4000+03	1.7756+03	1.7557+03	1.7748+03	1.7746+03
16	5.2240+00	1.0000+02	1.7694+03	1.7515+03	1.7687+03	1.7684+03
17	5.2240+00	3.3800+02	1.7672+03	1.7532+03	1.7666+03	1.7661+03
18	5.2240+00	6.5000+02	1.7460+03	1.7340+03	1.7454+03	1.7455+03
19	5.2240+00	1.1000+03	1.7419+03	1.7300+03	1.7413+03	1.7405+03
20	5.2240+00	1.4000+03	1.6894+03	1.6767+03	1.6888+03	1.6881+03
21	5.2240+00	1.7300+03	1.6525+03	1.6399+03	1.6516+03	1.6516+03
22	5.2240+00	2.1300+03	1.6494+03	1.6258+03	1.6487+03	1.6480+03
23	5.2240+00	2.4000+03	1.6410+03	1.6212+03	1.6405+03	1.6404+03
24	5.2340+00	3.0000+02	1.6077+03	1.5909+03	1.6077+03	1.6072+03
25	5.2340+00	4.3000+02	1.6152+03	1.5991+03	1.6146+03	1.6140+03
26	5.2340+00	1.1300+03	1.6125+03	1.6010+03	1.6123+03	1.6119+03
27	5.2340+00	1.3530+03	1.6390+03	1.6271+03	1.6389+03	1.6390+03
28	5.2340+00	1.4300+03	1.6400+03	1.6265+03	1.6397+03	1.6396+03
29	5.2340+00	2.3000+03	1.6667+03	1.6412+03	1.6656+03	1.6655+03
30	5.2440+00	3.0000+01	1.6660+03	1.6433+03	1.6654+03	1.6648+03
31	5.2440+00	3.3000+02	1.6928+03	1.6725+03	1.6920+03	1.6915+03
32	5.2440+00	8.3000+02	1.6450+03	1.6296+03	1.6447+03	1.6446+03
33	5.2440+00	1.2000+03	1.5954+03	1.5852+03	1.5955+03	1.5956+03
34	5.2440+00	1.3000+03	1.5868+03	1.5762+03	1.5868+03	1.5866+03
35	5.2440+00	1.4000+03	1.5765+03	1.5615+03	1.5767+03	1.5766+03
36	5.2440+00	1.6300+03	1.6547+03	1.6365+03	1.6550+03	1.6550+03
37	5.2440+00	1.8000+03	1.6550+03	1.6342+03	1.6552+03	1.6553+03
38	5.2440+00	1.9300+03	1.6526+03	1.6304+03	1.6528+03	1.6526+03
39	5.2440+00	1.9300+03	1.6649+03	1.6415+03	1.6639+03	1.6637+03
40	5.2540+00	3.0000+01	1.6560+03	1.6336+03	1.6550+03	1.6550+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	864	800	801	802	804	805
	POT-I	BW 91	BW 91	BW 91	BW 91	BW91-A
1	1.2200+03	1.2176+03	1.2180+03	1.2162+03	1.2201+03	1.2180+03
2	1.3885+03	1.3901+03	1.3896+03	1.3881+03	1.3918+03	1.3899+03
3	1.5652+03	1.5676+03	1.5662+03	1.5650+03	1.5672+03	1.5665+03
4	1.8077+03	1.8126+03	1.8110+03	1.8124+03	1.8093+03	1.8113+03
5	1.8069+03	1.8141+03	1.8132+03	1.8129+03	1.8111+03	1.8128+03
6	1.8183+03	1.8264+03	1.8241+03	1.8246+03	1.8225+03	1.8244+03
7	1.7870+03	1.7936+03	1.7919+03	1.7925+03	1.7900+03	1.7920+03
8	1.7780+03	1.7840+03	1.7810+03	1.7824+03	1.7802+03	1.7819+03
9	1.7631+03	1.7672+03	1.7650+03	1.7664+03	1.7638+03	1.7656+03
10	1.7433+03	1.7470+03	1.7456+03	1.7459+03	1.7439+03	1.7456+03
11	1.7441+03	1.7473+03	1.7464+03	1.7467+03	1.7449+03	1.7463+03
12	1.7476+03	1.7510+03	1.7493+03	1.7502+03	1.7491+03	1.7499+03
13	1.7451+03	1.7484+03	1.7466+03	1.7481+03	1.7470+03	1.7475+03
14	1.7482+03	1.7518+03	1.7498+03	1.7505+03	1.7495+03	1.7504+03
15	1.7566+03	1.7611+03	1.7596+03	1.7595+03	1.7582+03	1.7596+03
16	1.7522+03	1.7557+03	1.7545+03	1.7553+03	1.7535+03	1.7547+03
17	1.7541+03	1.7570+03	1.7559+03	1.7568+03	1.7546+03	1.7561+03
18	1.7352+03	1.7369+03	1.7362+03	1.7361+03	1.7350+03	1.7361+03
19	1.7307+03	1.7335+03	1.7321+03	1.7336+03	1.7319+03	1.7328+03
20	1.6772+03	1.6802+03	1.6797+03	1.6792+03	1.6793+03	1.6796+03
21	1.6406+03	1.6422+03	1.6420+03	1.6413+03	1.6425+03	1.6420+03
22	1.6267+03	1.6299+03	1.6291+03	1.6286+03	1.6291+03	1.6292+03
23	1.6219+03	1.6245+03	1.6239+03	1.6230+03	1.6242+03	1.6239+03
24	1.5913+03	1.5934+03	1.5916+03	1.5915+03	1.5926+03	1.5923+03
25	1.5999+03	1.6005+03	1.5997+03	1.5999+03	1.6008+03	1.6002+03
26	1.6019+03	1.6030+03	1.6029+03	1.6022+03	1.6027+03	1.6027+03
27	1.6288+03	1.6291+03	1.6285+03	1.6288+03	1.6326+03	1.6298+03
28	1.6275+03	1.6296+03	1.6288+03	1.6284+03	1.6281+03	1.6288+03
29	1.6421+03	1.6492+03	1.6484+03	1.6478+03	1.6480+03	1.6483+03
30	1.6442+03	1.6507+03	1.6498+03	1.6487+03	1.6488+03	1.6495+03
31	1.6737+03	1.6796+03	1.6787+03	1.6779+03	1.6777+03	1.6785+03
32	1.6307+03	1.6350+03	1.6334+03	1.6327+03	1.6332+03	1.6336+03
33	1.5860+03	1.5867+03	1.5858+03	1.5854+03	1.5869+03	1.5862+03
34	1.5772+03	1.5786+03	1.5783+03	1.5767+03	1.5783+03	1.5780+03
35	1.5627+03	1.5632+03	1.5617+03	1.5621+03	1.5635+03	1.5626+03
36	1.6377+03	1.6413+03	1.6405+03	1.6396+03	1.6402+03	1.6404+03
37	1.6351+03	1.6389+03	1.6378+03	1.6369+03	1.6376+03	1.6378+03
38	1.6319+03	1.6360+03	1.6346+03	1.6332+03	1.6350+03	1.6347+03
39	1.6425+03	1.6480+03	1.6460+03	1.6446+03	1.6459+03	1.6461+03
40	1.6346+03	1.6384+03	1.6377+03	1.6360+03	1.6370+03	1.6373+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	806	807	808	809	810	811
	BW 84	BW 84	BW 84	BW 84	BW84-A	BW 77
1	1.2173+03	1.2181+03	1.2188+03	1.2190+03	1.2183+03	1.2183+03
2	1.3902+03	1.3906+03	1.3904+03	1.3919+03	1.3908+03	1.3913+03
3	1.5684+03	1.5672+03	1.5669+03	1.5663+03	1.5672+03	1.5691+03
4	1.8140+03	1.8120+03	1.8118+03	1.8114+03	1.8123+03	1.8138+03
5	1.8162+03	1.8152+03	1.8140+03	1.8138+03	1.8148+03	1.8164+03
6	1.8287+03	1.8266+03	1.8255+03	1.8251+03	1.8265+03	1.8290+03
7	1.7957+03	1.7943+03	1.7930+03	1.7930+03	1.7940+03	1.7956+03
8	1.7857+03	1.7832+03	1.7837+03	1.7830+03	1.7839+03	1.7847+03
9	1.7694+03	1.7665+03	1.7674+03	1.7664+03	1.7674+03	1.7680+03
10	1.7486+03	1.7479+03	1.7483+03	1.7471+03	1.7480+03	1.7478+03
11	1.7494+03	1.7480+03	1.7481+03	1.7476+03	1.7483+03	1.7486+03
12	1.7534+03	1.7511+03	1.7519+03	1.7507+03	1.7518+03	1.7532+03
13	1.7502+03	1.7486+03	1.7490+03	1.7481+03	1.7490+03	1.7499+03
14	1.7531+03	1.7524+03	1.7530+03	1.7515+03	1.7525+03	1.7528+03
15	1.7619+03	1.7613+03	1.7619+03	1.7604+03	1.7613+03	1.7616+03
16	1.7574+03	1.7556+03	1.7561+03	1.7551+03	1.7560+03	1.7570+03
17	1.7586+03	1.7568+03	1.7577+03	1.7562+03	1.7573+03	1.7583+03
18	1.7384+03	1.7367+03	1.7378+03	1.7375+03	1.7376+03	1.7378+03
19	1.7358+03	1.7339+03	1.7349+03	1.7340+03	1.7347+03	1.7346+03
20	1.6820+03	1.6810+03	1.6825+03	1.6812+03	1.6817+03	1.6801+03
21	1.6440+03	1.6433+03	1.6447+03	1.6432+03	1.6438+03	1.6424+03
22	1.6315+03	1.6300+03	1.6306+03	1.6296+03	1.6304+03	1.6312+03
23	1.6260+03	1.6248+03	1.6254+03	1.6245+03	1.6252+03	1.6255+03
24	1.5955+03	1.5934+03	1.5945+03	1.5932+03	1.5942+03	1.5944+03
25	1.6028+03	1.6015+03	1.6022+03	1.6010+03	1.6019+03	1.6018+03
26	1.6050+03	1.6045+03	1.6060+03	1.6047+03	1.6050+03	1.6032+03
27	1.6302+03	1.6289+03	1.6306+03	1.6299+03	1.6299+03	1.6303+03
28	1.6309+03	1.6291+03	1.6315+03	1.6301+03	1.6304+03	1.6292+03
29	1.6513+03	1.6492+03	1.6502+03	1.6492+03	1.6500+03	1.6510+03
30	1.6527+03	1.6509+03	1.6515+03	1.6503+03	1.6514+03	1.6517+03
31	1.6812+03	1.6800+03	1.6807+03	1.6798+03	1.6804+03	1.6799+03
32	1.6355+03	1.6344+03	1.6365+03	1.6347+03	1.6353+03	1.6344+03
33	1.5886+03	1.5880+03	1.5885+03	1.5879+03	1.5883+03	1.5869+03
34	1.5798+03	1.5783+03	1.5799+03	1.5800+03	1.5795+03	1.5783+03
35	1.5649+03	1.5632+03	1.5647+03	1.5636+03	1.5641+03	1.5644+03
36	1.6431+03	1.6419+03	1.6424+03	1.6418+03	1.6423+03	1.6417+03
37	1.6409+03	1.6387+03	1.6396+03	1.6386+03	1.6395+03	1.6406+03
38	1.6386+03	1.6359+03	1.6372+03	1.6359+03	1.6369+03	1.6366+03
39	1.6487+03	1.6471+03	1.6485+03	1.6469+03	1.6478+03	1.6480+03
40	1.6400+03	1.6385+03	1.6389+03	1.6389+03	1.6391+03	1.6394+03

	812	813	814	815	816	817
	BW 77	BW 77	BW 77	BW77-A	BW 70	BW 70
1	1.2175+03	1.2179+03	1.2184+03	1.2180+03	1.2171+03	1.2181+03
2	1.3905+03	1.3901+03	1.3911+03	1.3908+03	1.3914+03	1.3915+03
3	1.5674+03	1.5672+03	1.5671+03	1.5677+03	1.5667+03	1.5678+03
4	1.8143+03	1.8125+03	1.8132+03	1.8134+03	1.8142+03	1.8153+03
5	1.8183+03	1.8141+03	1.8156+03	1.8161+03	1.8163+03	1.8185+03
6	1.8298+03	1.8265+03	1.8265+03	1.8280+03	1.8278+03	1.8299+03
7	1.7966+03	1.7933+03	1.7939+03	1.7949+03	1.7949+03	1.7966+03
8	1.7864+03	1.7833+03	1.7838+03	1.7845+03	1.7841+03	1.7849+03
9	1.7692+03	1.7668+03	1.7668+03	1.7677+03	1.7667+03	1.7674+03
10	1.7503+03	1.7461+03	1.7478+03	1.7480+03	1.7478+03	1.7489+03
11	1.7507+03	1.7474+03	1.7482+03	1.7487+03	1.7483+03	1.7497+03
12	1.7541+03	1.7511+03	1.7520+03	1.7526+03	1.7528+03	1.7531+03
13	1.7511+03	1.7482+03	1.7491+03	1.7496+03	1.7499+03	1.7512+03
14	1.7550+03	1.7509+03	1.7524+03	1.7528+03	1.7526+03	1.7539+03
15	1.7633+03	1.7598+03	1.7613+03	1.7615+03	1.7613+03	1.7626+03
16	1.7577+03	1.7545+03	1.7568+03	1.7565+03	1.7563+03	1.7580+03
17	1.7586+03	1.7561+03	1.7569+03	1.7575+03	1.7576+03	1.7588+03
18	1.7384+03	1.7359+03	1.7380+03	1.7375+03	1.7373+03	1.7384+03
19	1.7359+03	1.7334+03	1.7340+03	1.7345+03	1.7339+03	1.7348+03
20	1.6828+03	1.6792+03	1.6809+03	1.6808+03	1.6797+03	1.6806+03
21	1.6446+03	1.6413+03	1.6431+03	1.6429+03	1.6418+03	1.6426+03
22	1.6310+03	1.6286+03	1.6304+03	1.6303+03	1.6310+03	1.6325+03
23	1.6255+03	1.6232+03	1.6253+03	1.6249+03	1.6250+03	1.6262+03
24	1.5946+03	1.5927+03	1.5942+03	1.5940+03	1.5928+03	1.5941+03
25	1.6019+03	1.6003+03	1.6012+03	1.6013+03	1.6022+03	1.6030+03
26	1.6053+03	1.6025+03	1.6039+03	1.6038+03	1.6029+03	1.6035+03
27	1.6315+03	1.6292+03	1.6296+03	1.6302+03	1.6297+03	1.6301+03
28	1.6309+03	1.6275+03	1.6301+03	1.6294+03	1.6285+03	1.6292+03
29	1.6510+03	1.6482+03	1.6497+03	1.6500+03	1.6482+03	1.6499+03
30	1.6521+03	1.6496+03	1.6511+03	1.6511+03	1.6494+03	1.6508+03
31	1.6807+03	1.6781+03	1.6808+03	1.6799+03	1.6791+03	1.6799+03
32	1.6350+03	1.6329+03	1.6349+03	1.6343+03	1.6334+03	1.6343+03
33	1.5879+03	1.5860+03	1.5885+03	1.5873+03	1.5871+03	1.5869+03
34	1.5791+03	1.5775+03	1.5783+03	1.5783+03	1.5768+03	1.5785+03
35	1.5648+03	1.5614+03	1.5638+03	1.5636+03	1.5627+03	1.5630+03
36	1.6426+03	1.6402+03	1.6424+03	1.6417+03	1.6415+03	1.6420+03
37	1.6407+03	1.6371+03	1.6396+03	1.6395+03	1.6384+03	1.6398+03
38	1.6377+03	1.6343+03	1.6367+03	1.6363+03	1.6359+03	1.6372+03
39	1.6483+03	1.6452+03	1.6485+03	1.6475+03	1.6473+03	1.6483+03
40	1.6397+03	1.6369+03	1.6401+03	1.6390+03	1.6385+03	1.6400+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	818	819	820	821	822	823
	BW 70	BW 70	BW70-A	BW 63	BW 63	BW 63
1	1.2181+03	1.2181+03	1.2178+03	1.2189+03	1.2174+03	1.2188+03
2	1.3909+03	1.3913+03	1.3913+03	1.3909+03	1.3907+03	1.3922+03
3	1.5675+03	1.5682+03	1.5676+03	1.5670+03	1.5685+03	1.5673+03
4	1.8130+03	1.8144+03	1.8142+03	1.8113+03	1.8138+03	1.8140+03
5	1.8173+03	1.8188+03	1.8177+03	1.8166+03	1.8192+03	1.8181+03
6	1.8278+03	1.8302+03	1.8289+03	1.8268+03	1.8305+03	1.8295+03
7	1.7947+03	1.7972+03	1.7959+03	1.7936+03	1.7978+03	1.7965+03
8	1.7841+03	1.7860+03	1.7848+03	1.7829+03	1.7844+03	1.7861+03
9	1.7668+03	1.7690+03	1.7675+03	1.7653+03	1.7667+03	1.7681+03
10	1.7483+03	1.7505+03	1.7489+03	1.7465+03	1.7485+03	1.7491+03
11	1.7490+03	1.7510+03	1.7495+03	1.7482+03	1.7489+03	1.7498+03
12	1.7522+03	1.7546+03	1.7532+03	1.7511+03	1.7527+03	1.7543+03
13	1.7497+03	1.7517+03	1.7506+03	1.7486+03	1.7501+03	1.7513+03
14	1.7528+03	1.7556+03	1.7537+03	1.7513+03	1.7535+03	1.7540+03
15	1.7617+03	1.7639+03	1.7624+03	1.7612+03	1.7619+03	1.7626+03
16	1.7558+03	1.7596+03	1.7574+03	1.7547+03	1.7570+03	1.7576+03
17	1.7566+03	1.7601+03	1.7583+03	1.7553+03	1.7585+03	1.7585+03
18	1.7362+03	1.7403+03	1.7380+03	1.7350+03	1.7380+03	1.7383+03
19	1.7332+03	1.7363+03	1.7346+03	1.7321+03	1.7345+03	1.7352+03
20	1.6805+03	1.6826+03	1.6808+03	1.6782+03	1.6800+03	1.6814+03
21	1.6427+03	1.6450+03	1.6430+03	1.6412+03	1.6424+03	1.6436+03
22	1.6301+03	1.6332+03	1.6317+03	1.6309+03	1.6315+03	1.6335+03
23	1.6243+03	1.6280+03	1.6259+03	1.6241+03	1.6265+03	1.6274+03
24	1.5933+03	1.5958+03	1.5940+03	1.5943+03	1.5942+03	1.5952+03
25	1.6005+03	1.6036+03	1.6023+03	1.6011+03	1.6018+03	1.6042+03
26	1.6026+03	1.6056+03	1.6037+03	1.6020+03	1.6030+03	1.6048+03
27	1.6297+03	1.6321+03	1.6304+03	1.6301+03	1.6299+03	1.6322+03
28	1.6289+03	1.6318+03	1.6296+03	1.6281+03	1.6290+03	1.6305+03
29	1.6490+03	1.6525+03	1.6499+03	1.6481+03	1.6500+03	1.6506+03
30	1.6498+03	1.6533+03	1.6508+03	1.6501+03	1.6509+03	1.6519+03
31	1.6779+03	1.6829+03	1.6800+03	1.6776+03	1.6793+03	1.6811+03
32	1.6324+03	1.6371+03	1.6343+03	1.6325+03	1.6328+03	1.6358+03
33	1.5856+03	1.5891+03	1.5872+03	1.5855+03	1.5856+03	1.5879+03
34	1.5768+03	1.5797+03	1.5780+03	1.5772+03	1.5767+03	1.5788+03
35	1.5629+03	1.5659+03	1.5636+03	1.5624+03	1.5641+03	1.5652+03
36	1.6398+03	1.6438+03	1.6418+03	1.6405+03	1.6414+03	1.6429+03
37	1.6395+03	1.6423+03	1.6400+03	1.6385+03	1.6402+03	1.6413+03
38	1.6347+03	1.6401+03	1.6370+03	1.6352+03	1.6369+03	1.6389+03
39	1.6465+03	1.6513+03	1.6484+03	1.6470+03	1.6482+03	1.6497+03
40	1.6376+03	1.6421+03	1.6396+03	1.6378+03	1.6394+03	1.6417+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	824	825	826	827	828	829
	BW63-A	BW 58	BW 58	BW 58	BW 58	BW 58
1	1.2184+03	1.2173+03	1.2169+03	1.2172+03	1.2173+03	1.2207+03
2	1.3913+03	1.3904+03	1.3905+03	1.3908+03	1.3908+03	1.3935+03
3	1.5676+03	1.5676+03	1.5678+03	1.5691+03	1.5691+03	1.5688+03
4	1.8130+03	1.8145+03	1.8136+03	1.8155+03	1.8144+03	1.8125+03
5	1.8180+03	1.8203+03	1.8188+03	1.8224+03	1.8218+03	1.8190+03
6	1.8289+03	1.8315+03	1.8299+03	1.8339+03	1.8328+03	1.8293+03
7	1.7959+03	1.7976+03	1.7971+03	1.7985+03	1.7981+03	1.7953+03
8	1.7845+03	1.7857+03	1.7845+03	1.7862+03	1.7854+03	1.7833+03
9	1.7667+03	1.7677+03	1.7672+03	1.7683+03	1.7675+03	1.7657+03
10	1.7480+03	1.7492+03	1.7488+03	1.7501+03	1.7495+03	1.7481+03
11	1.7490+03	1.7503+03	1.7494+03	1.7511+03	1.7505+03	1.7489+03
12	1.7527+03	1.7533+03	1.7530+03	1.7542+03	1.7539+03	1.7525+03
13	1.7500+03	1.7516+03	1.7502+03	1.7515+03	1.7513+03	1.7496+03
14	1.7529+03	1.7540+03	1.7537+03	1.7558+03	1.7548+03	1.7531+03
15	1.7619+03	1.7631+03	1.7624+03	1.7639+03	1.7630+03	1.7612+03
16	1.7564+03	1.7577+03	1.7571+03	1.7586+03	1.7587+03	1.7560+03
17	1.7574+03	1.7585+03	1.7573+03	1.7583+03	1.7579+03	1.7566+03
18	1.7371+03	1.7383+03	1.7368+03	1.7373+03	1.7372+03	1.7358+03
19	1.7339+03	1.7350+03	1.7334+03	1.7344+03	1.7337+03	1.7318+03
20	1.6799+03	1.6806+03	1.6800+03	1.6805+03	1.6806+03	1.6787+03
21	1.6424+03	1.6424+03	1.6425+03	1.6427+03	1.6431+03	1.6416+03
22	1.6320+03	1.6315+03	1.6308+03	1.6328+03	1.6329+03	1.6317+03
23	1.6260+03	1.6263+03	1.6247+03	1.6257+03	1.6266+03	1.6257+03
24	1.5946+03	1.5935+03	1.5935+03	1.5957+03	1.5954+03	1.5938+03
25	1.6024+03	1.6013+03	1.6012+03	1.6019+03	1.6024+03	1.6020+03
26	1.6033+03	1.6034+03	1.6019+03	1.6028+03	1.6027+03	1.6027+03
27	1.6308+03	1.6309+03	1.6309+03	1.6319+03	1.6305+03	1.6307+03
28	1.6292+03	1.6293+03	1.6278+03	1.6293+03	1.6291+03	1.6282+03
29	1.6496+03	1.6497+03	1.6481+03	1.6505+03	1.6509+03	1.6494+03
30	1.6510+03	1.6504+03	1.6506+03	1.6517+03	1.6523+03	1.6507+03
31	1.6793+03	1.6788+03	1.6790+03	1.6804+03	1.6802+03	1.6792+03
32	1.6337+03	1.6329+03	1.6331+03	1.6342+03	1.6340+03	1.6328+03
33	1.5863+03	1.5857+03	1.5860+03	1.5868+03	1.5862+03	1.5860+03
34	1.5776+03	1.5772+03	1.5775+03	1.5768+03	1.5774+03	1.5773+03
35	1.5639+03	1.5629+03	1.5629+03	1.5633+03	1.5636+03	1.5639+03
36	1.6416+03	1.6414+03	1.6411+03	1.6436+03	1.6430+03	1.6419+03
37	1.6400+03	1.6392+03	1.6389+03	1.6407+03	1.6406+03	1.6399+03
38	1.6370+03	1.6362+03	1.6365+03	1.6378+03	1.6379+03	1.6371+03
39	1.6483+03	1.6475+03	1.6475+03	1.6501+03	1.6500+03	1.6485+03
40	1.6396+03	1.6388+03	1.6386+03	1.6406+03	1.6409+03	1.6398+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	830	831	832	833	834	835
	BW 58	BW58-A	BW 50	BW 50	BW 50	BW 50
1	1.2194+03	1.2182+03	1.2181+03	1.2187+03	1.2189+03	1.2193+03
2	1.3921+03	1.3913+03	1.3912+03	1.3926+03	1.3913+03	1.3922+03
3	1.5688+03	1.5685+03	1.5688+03	1.5708+03	1.5685+03	1.5690+03
4	1.8158+03	1.8144+03	1.8153+03	1.8149+03	1.8136+03	1.8149+03
5	1.8222+03	1.8207+03	1.8225+03	1.8230+03	1.8202+03	1.8219+03
6	1.8331+03	1.8318+03	1.8321+03	1.8341+03	1.8307+03	1.8321+03
7	1.7994+03	1.7977+03	1.7983+03	1.7991+03	1.7967+03	1.7980+03
8	1.7881+03	1.7855+03	1.7793+03	1.7864+03	1.7850+03	1.7863+03
9	1.7702+03	1.7678+03	1.7634+03	1.7680+03	1.7672+03	1.7678+03
10	1.7518+03	1.7496+03	1.7494+03	1.7508+03	1.7487+03	1.7503+03
11	1.7526+03	1.7505+03	1.7484+03	1.7511+03	1.7501+03	1.7516+03
12	1.7559+03	1.7538+03	1.7456+03	1.7549+03	1.7540+03	1.7546+03
13	1.7539+03	1.7514+03	1.7439+03	1.7519+03	1.7514+03	1.7520+03
14	1.7573+03	1.7548+03	1.7543+03	1.7563+03	1.7541+03	1.7552+03
15	1.7656+03	1.7632+03	1.7574+03	1.7637+03	1.7629+03	1.7642+03
16	1.7604+03	1.7581+03	1.7644+03	1.7580+03	1.7570+03	1.7584+03
17	1.7605+03	1.7582+03	1.7574+03	1.7582+03	1.7575+03	1.7581+03
18	1.7404+03	1.7376+03	1.7291+03	1.7375+03	1.7372+03	1.7375+03
19	1.7364+03	1.7341+03	1.7346+03	1.7344+03	1.7341+03	1.7344+03
20	1.6827+03	1.6805+03	1.6807+03	1.6808+03	1.6799+03	1.6810+03
21	1.6456+03	1.6430+03	1.6432+03	1.6430+03	1.6427+03	1.6436+03
22	1.6345+03	1.6324+03	1.6332+03	1.6349+03	1.6327+03	1.6344+03
23	1.6288+03	1.6263+03	1.6271+03	1.6282+03	1.6269+03	1.6278+03
24	1.5963+03	1.5947+03	1.5957+03	1.5973+03	1.5952+03	1.5968+03
25	1.6048+03	1.6023+03	1.6029+03	1.6042+03	1.6027+03	1.6041+03
26	1.6059+03	1.6032+03	1.6035+03	1.6040+03	1.6035+03	1.6042+03
27	1.6350+03	1.6317+03	1.6316+03	1.6321+03	1.6316+03	1.6324+03
28	1.6315+03	1.6292+03	1.6298+03	1.6301+03	1.6295+03	1.6308+03
29	1.6526+03	1.6502+03	1.6507+03	1.6519+03	1.6502+03	1.6524+03
30	1.6536+03	1.6516+03	1.6520+03	1.6528+03	1.6510+03	1.6528+03
31	1.6826+03	1.6800+03	1.6802+03	1.6817+03	1.6794+03	1.6814+03
32	1.6367+03	1.6340+03	1.6342+03	1.6357+03	1.6340+03	1.6349+03
33	1.5896+03	1.5867+03	1.5866+03	1.5874+03	1.5866+03	1.5874+03
34	1.5809+03	1.5778+03	1.5775+03	1.5781+03	1.5781+03	1.5783+03
35	1.5672+03	1.5640+03	1.5642+03	1.5659+03	1.5645+03	1.5659+03
36	1.6456+03	1.6428+03	1.6432+03	1.6436+03	1.6422+03	1.6440+03
37	1.6433+03	1.6404+03	1.6411+03	1.6430+03	1.6409+03	1.6430+03
38	1.6403+03	1.6376+03	1.6384+03	1.6408+03	1.6374+03	1.6395+03
39	1.6519+03	1.6493+03	1.6496+03	1.6515+03	1.6489+03	1.6503+03
40	1.6432+03	1.6403+03	1.6407+03	1.6427+03	1.6401+03	1.6420+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	836	837	838	839	840	841
	BW 50	BW50-A	BW 43	BW 43	BW 43	BW 43
1	1.2188+03	1.2188+03	1.2185+03	1.2187+03	1.2184+03	1.2185+03
2	1.3919+03	1.3919+03	1.3912+03	1.3923+03	1.3913+03	1.3920+03
3	1.5697+03	1.5694+03	1.5687+03	1.5709+03	1.5696+03	1.5707+03
4	1.8151+03	1.8148+03	1.8142+03	1.8152+03	1.8158+03	1.8162+03
5	1.8229+03	1.8221+03	1.8214+03	1.8275+03	1.8236+03	1.8246+03
6	1.8339+03	1.8326+03	1.8319+03	1.8357+03	1.8346+03	1.8355+03
7	1.7995+03	1.7983+03	1.7974+03	1.8007+03	1.8000+03	1.8008+03
8	1.7865+03	1.7847+03	1.7854+03	1.7863+03	1.7875+03	1.7873+03
9	1.7684+03	1.7670+03	1.7669+03	1.7677+03	1.7691+03	1.7686+03
10	1.7510+03	1.7500+03	1.7494+03	1.7508+03	1.7513+03	1.7515+03
11	1.7520+03	1.7506+03	1.7507+03	1.7518+03	1.7524+03	1.7525+03
12	1.7555+03	1.7529+03	1.7538+03	1.7555+03	1.7562+03	1.7562+03
13	1.7528+03	1.7504+03	1.7514+03	1.7527+03	1.7538+03	1.7534+03
14	1.7564+03	1.7553+03	1.7544+03	1.7562+03	1.7564+03	1.7572+03
15	1.7648+03	1.7626+03	1.7633+03	1.7645+03	1.7651+03	1.7652+03
16	1.7595+03	1.7595+03	1.7578+03	1.7590+03	1.7595+03	1.7595+03
17	1.7588+03	1.7580+03	1.7574+03	1.7581+03	1.7597+03	1.7588+03
18	1.7383+03	1.7359+03	1.7368+03	1.7374+03	1.7392+03	1.7380+03
19	1.7352+03	1.7345+03	1.7337+03	1.7340+03	1.7362+03	1.7346+03
20	1.6821+03	1.6809+03	1.6802+03	1.6811+03	1.6821+03	1.6815+03
21	1.6444+03	1.6434+03	1.6426+03	1.6435+03	1.6446+03	1.6441+03
22	1.6354+03	1.6341+03	1.6333+03	1.6360+03	1.6351+03	1.6360+03
23	1.6289+03	1.6278+03	1.6270+03	1.6290+03	1.6289+03	1.6294+03
24	1.5980+03	1.5966+03	1.5958+03	1.5981+03	1.5973+03	1.5983+03
25	1.6046+03	1.6037+03	1.6032+03	1.6045+03	1.6045+03	1.6050+03
26	1.6048+03	1.6040+03	1.6033+03	1.6039+03	1.6049+03	1.6045+03
27	1.6328+03	1.6321+03	1.6311+03	1.6313+03	1.6327+03	1.6320+03
28	1.6310+03	1.6302+03	1.6298+03	1.6307+03	1.6311+03	1.6314+03
29	1.6532+03	1.6517+03	1.6515+03	1.6530+03	1.6525+03	1.6541+03
30	1.6541+03	1.6525+03	1.6518+03	1.6538+03	1.6536+03	1.6544+03
31	1.6828+03	1.6811+03	1.6803+03	1.6822+03	1.6821+03	1.6830+03
32	1.6361+03	1.6350+03	1.6339+03	1.6353+03	1.6362+03	1.6358+03
33	1.5883+03	1.5873+03	1.5866+03	1.5870+03	1.5884+03	1.5874+03
34	1.5791+03	1.5782+03	1.5777+03	1.5778+03	1.5793+03	1.5786+03
35	1.5664+03	1.5654+03	1.5644+03	1.5660+03	1.5664+03	1.5663+03
36	1.6451+03	1.6436+03	1.6434+03	1.6446+03	1.6450+03	1.6453+03
37	1.6438+03	1.6423+03	1.6416+03	1.6440+03	1.6437+03	1.6443+03
38	1.6411+03	1.6394+03	1.6389+03	1.6413+03	1.6406+03	1.6416+03
39	1.6523+03	1.6505+03	1.6494+03	1.6522+03	1.6518+03	1.6527+03
40	1.6433+03	1.6418+03	1.6410+03	1.6435+03	1.6428+03	1.6441+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	842	843	844	845	846	847
	BW43-A	BW 36	BW 36	BW 36	BW 36	BW36-A
1	1.2185+03	1.2187+03	1.2176+03	1.2188+03	1.2176+03	1.2182+03
2	1.3917+03	1.3920+03	1.3917+03	1.3924+03	1.3914+03	1.3919+03
3	1.5700+03	1.5702+03	1.5715+03	1.5715+03	1.5715+03	1.5712+03
4	1.8153+03	1.8156+03	1.8164+03	1.8166+03	1.8189+03	1.8169+03
5	1.8243+03	1.8252+03	1.8267+03	1.8278+03	1.8285+03	1.8271+03
6	1.8344+03	1.8361+03	1.8369+03	1.8382+03	1.8385+03	1.8374+03
7	1.7997+03	1.8007+03	1.8017+03	1.8023+03	1.8039+03	1.8021+03
8	1.7866+03	1.7873+03	1.7877+03	1.7888+03	1.7903+03	1.7885+03
9	1.7681+03	1.7680+03	1.7686+03	1.7693+03	1.7714+03	1.7693+03
10	1.7507+03	1.7516+03	1.7517+03	1.7527+03	1.7540+03	1.7525+03
11	1.7519+03	1.7524+03	1.7525+03	1.7539+03	1.7549+03	1.7534+03
12	1.7554+03	1.7562+03	1.7564+03	1.7577+03	1.7584+03	1.7572+03
13	1.7528+03	1.7531+03	1.7537+03	1.7547+03	1.7562+03	1.7544+03
14	1.7560+03	1.7562+03	1.7569+03	1.7579+03	1.7594+03	1.7576+03
15	1.7645+03	1.7647+03	1.7654+03	1.7665+03	1.7677+03	1.7661+03
16	1.7589+03	1.7590+03	1.7596+03	1.7604+03	1.7622+03	1.7603+03
17	1.7585+03	1.7587+03	1.7583+03	1.7594+03	1.7612+03	1.7594+03
18	1.7379+03	1.7379+03	1.7372+03	1.7389+03	1.7404+03	1.7386+03
19	1.7346+03	1.7347+03	1.7343+03	1.7356+03	1.7375+03	1.7355+03
20	1.6812+03	1.6815+03	1.6810+03	1.6826+03	1.6836+03	1.6822+03
21	1.6437+03	1.6438+03	1.6435+03	1.6452+03	1.6459+03	1.6446+03
22	1.6351+03	1.6353+03	1.6369+03	1.6379+03	1.6384+03	1.6371+03
23	1.6286+03	1.6294+03	1.6293+03	1.6313+03	1.6310+03	1.6302+03
24	1.5974+03	1.5975+03	1.5977+03	1.5995+03	1.5997+03	1.5986+03
25	1.6043+03	1.6041+03	1.6048+03	1.6063+03	1.6067+03	1.6055+03
26	1.6041+03	1.6039+03	1.6042+03	1.6056+03	1.6064+03	1.6050+03
27	1.6318+03	1.6310+03	1.6305+03	1.6320+03	1.6334+03	1.6317+03
28	1.6308+03	1.6307+03	1.6310+03	1.6325+03	1.6332+03	1.6319+03
29	1.6527+03	1.6535+03	1.6539+03	1.6558+03	1.6558+03	1.6547+03
30	1.6534+03	1.6542+03	1.6541+03	1.6563+03	1.6561+03	1.6552+03
31	1.6819+03	1.6820+03	1.6824+03	1.6840+03	1.6842+03	1.6831+03
32	1.6353+03	1.6350+03	1.6354+03	1.6369+03	1.6379+03	1.6363+03
33	1.5873+03	1.5870+03	1.5867+03	1.5886+03	1.5893+03	1.5879+03
34	1.5783+03	1.5779+03	1.5781+03	1.5795+03	1.5803+03	1.5790+03
35	1.5658+03	1.5662+03	1.5664+03	1.5679+03	1.5679+03	1.5671+03
36	1.6446+03	1.6448+03	1.6451+03	1.6468+03	1.6479+03	1.6462+03
37	1.6434+03	1.6441+03	1.6441+03	1.6462+03	1.6462+03	1.6452+03
38	1.6406+03	1.6406+03	1.6416+03	1.6433+03	1.6433+03	1.6422+03
39	1.6515+03	1.6514+03	1.6529+03	1.6547+03	1.6550+03	1.6535+03
40	1.6429+03	1.6431+03	1.6439+03	1.6455+03	1.6457+03	1.6446+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	848	849	850	851	852	853
	BW 29	BW 29	BW 29	BW29-A	BW 23	BW 23
1	1.2187+03	1.2187+03	1.2171+03	1.2181+03	1.2174+03	1.2221+03
2	1.3933+03	1.3931+03	1.3914+03	1.3926+03	1.3932+03	1.3959+03
3	1.5724+03	1.5732+03	1.5719+03	1.5725+03	1.5746+03	1.5734+03
4	1.8178+03	1.8186+03	1.8194+03	1.8186+03	1.8205+03	1.8152+03
5	1.8299+03	1.8313+03	1.8292+03	1.8301+03	1.8338+03	1.8267+03
6	1.8404+03	1.8404+03	1.8398+03	1.8402+03	1.8443+03	1.8369+03
7	1.8041+03	1.8050+03	1.8046+03	1.8046+03	1.8077+03	1.8014+03
8	1.7902+03	1.7908+03	1.7912+03	1.7907+03	1.7923+03	1.7868+03
9	1.7701+03	1.7715+03	1.7722+03	1.7713+03	1.7720+03	1.7673+03
10	1.7542+03	1.7545+03	1.7552+03	1.7546+03	1.7565+03	1.7514+03
11	1.7554+03	1.7559+03	1.7558+03	1.7557+03	1.7573+03	1.7524+03
12	1.7593+03	1.7597+03	1.7594+03	1.7595+03	1.7613+03	1.7566+03
13	1.7566+03	1.7569+03	1.7568+03	1.7568+03	1.7578+03	1.7543+03
14	1.7592+03	1.7600+03	1.7600+03	1.7597+03	1.7618+03	1.7575+03
15	1.7677+03	1.7684+03	1.7686+03	1.7683+03	1.7699+03	1.7655+03
16	1.7615+03	1.7625+03	1.7630+03	1.7623+03	1.7638+03	1.7596+03
17	1.7606+03	1.7611+03	1.7622+03	1.7613+03	1.7625+03	1.7588+03
18	1.7398+03	1.7403+03	1.7412+03	1.7404+03	1.7411+03	1.7378+03
19	1.7365+03	1.7370+03	1.7382+03	1.7372+03	1.7382+03	1.7344+03
20	1.6834+03	1.6837+03	1.6844+03	1.6838+03	1.6848+03	1.6819+03
21	1.6460+03	1.6461+03	1.6466+03	1.6462+03	1.6468+03	1.6449+03
22	1.6392+03	1.6403+03	1.6391+03	1.6395+03	1.6419+03	1.6386+03
23	1.6327+03	1.6330+03	1.6319+03	1.6325+03	1.6340+03	1.6316+03
24	1.6006+03	1.6010+03	1.6002+03	1.6006+03	1.6021+03	1.5997+03
25	1.6071+03	1.6078+03	1.6072+03	1.6074+03	1.6083+03	1.6069+03
26	1.6064+03	1.6069+03	1.6072+03	1.6069+03	1.6068+03	1.6058+03
27	1.6330+03	1.6331+03	1.6339+03	1.6333+03	1.6337+03	1.6323+03
28	1.6334+03	1.6339+03	1.6340+03	1.6338+03	1.6346+03	1.6331+03
29	1.6577+03	1.6572+03	1.6568+03	1.6572+03	1.6598+03	1.6560+03
30	1.6580+03	1.6577+03	1.6570+03	1.6576+03	1.6595+03	1.6565+03
31	1.6857+03	1.6855+03	1.6853+03	1.6855+03	1.6871+03	1.6839+03
32	1.6382+03	1.6390+03	1.6387+03	1.6386+03	1.6395+03	1.6370+03
33	1.5896+03	1.5899+03	1.5902+03	1.5899+03	1.5898+03	1.5892+03
34	1.5801+03	1.5806+03	1.5810+03	1.5806+03	1.5807+03	1.5801+03
35	1.5693+03	1.5694+03	1.5691+03	1.5693+03	1.5698+03	1.5687+03
36	1.6483+03	1.6491+03	1.6484+03	1.6486+03	1.6499+03	1.6471+03
37	1.6486+03	1.6481+03	1.6472+03	1.6480+03	1.6494+03	1.6463+03
38	1.6449+03	1.6455+03	1.6445+03	1.6449+03	1.6471+03	1.6434+03
39	1.6564+03	1.6568+03	1.6558+03	1.6563+03	1.6582+03	1.6548+03
40	1.6474+03	1.6474+03	1.6464+03	1.6471+03	1.6487+03	1.6462+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	855	856	857	858	859	866
	BW 23	BW 23	BW 23	BW 23	BW-23A	SIT-I
1	1.2180+03	1.2188+03	1.2171+03	1.2188+03	1.2187+03	1.0551+03
2	1.3929+03	1.3945+03	1.3922+03	1.3938+03	1.3937+03	1.2067+03
3	1.5727+03	1.5746+03	1.5729+03	1.5740+03	1.5737+03	1.4245+03
4	1.8193+03	1.8198+03	1.8196+03	1.8207+03	1.8192+03	1.6951+03
5	1.8307+03	1.8339+03	1.8307+03	1.8320+03	1.8313+03	1.5909+03
6	1.8406+03	1.8444+03	1.8411+03	1.8424+03	1.8416+03	1.6133+03
7	1.8050+03	1.8077+03	1.8059+03	1.8072+03	1.8058+03	1.5935+03
8	1.7908+03	1.7924+03	1.7912+03	1.7925+03	1.7910+03	1.6046+03
9	1.7709+03	1.7722+03	1.7714+03	1.7727+03	1.7711+03	1.6002+03
10	1.7547+03	1.7565+03	1.7553+03	1.7571+03	1.7553+03	1.5570+03
11	1.7556+03	1.7580+03	1.7562+03	1.7575+03	1.7562+03	1.5399+03
12	1.7591+03	1.7616+03	1.7594+03	1.7611+03	1.7598+03	1.5407+03
13	1.7567+03	1.7594+03	1.7566+03	1.7589+03	1.7573+03	1.5249+03
14	1.7599+03	1.7621+03	1.7604+03	1.7622+03	1.7607+03	1.5047+03
15	1.7682+03	1.7706+03	1.7685+03	1.7701+03	1.7688+03	1.4972+03
16	1.7624+03	1.7642+03	1.7626+03	1.7642+03	1.7628+03	1.4970+03
17	1.7610+03	1.7623+03	1.7613+03	1.7631+03	1.7615+03	1.5157+03
18	1.7402+03	1.7416+03	1.7403+03	1.7420+03	1.7405+03	1.5212+03
19	1.7369+03	1.7378+03	1.7373+03	1.7390+03	1.7372+03	1.4017+03
20	1.6833+03	1.6847+03	1.6836+03	1.6856+03	1.6840+03	1.5185+03
21	1.6459+03	1.6476+03	1.6450+03	1.6478+03	1.6463+03	1.4965+03
22	1.6393+03	1.6420+03	1.6397+03	1.6421+03	1.6406+03	1.4327+03
23	1.6323+03	1.6350+03	1.6325+03	1.6344+03	1.6333+03	1.4392+03
24	1.6002+03	1.6015+03	1.6003+03	1.6030+03	1.6011+03	1.4240+03
25	1.6070+03	1.6082+03	1.6072+03	1.6095+03	1.6079+03	1.4377+03
26	1.6064+03	1.6071+03	1.6067+03	1.6085+03	1.6069+03	1.4820+03
27	1.6325+03	1.6345+03	1.6324+03	1.6348+03	1.6334+03	1.4775+03
28	1.6332+03	1.6350+03	1.6335+03	1.6360+03	1.6342+03	1.4566+03
29	1.6569+03	1.6600+03	1.6573+03	1.6594+03	1.6582+03	1.4780+03
30	1.6575+03	1.6595+03	1.6577+03	1.6600+03	1.6584+03	1.5044+03
31	1.6854+03	1.6870+03	1.6852+03	1.6878+03	1.6860+03	1.5492+03
32	1.6378+03	1.6397+03	1.6380+03	1.6408+03	1.6388+03	1.5225+03
33	1.5890+03	1.5907+03	1.5890+03	1.5917+03	1.5899+03	1.4962+03
34	1.5798+03	1.5813+03	1.5799+03	1.5825+03	1.5807+03	1.4778+03
35	1.5683+03	1.5708+03	1.5686+03	1.5712+03	1.5696+03	1.3973+03
36	1.6479+03	1.6505+03	1.6482+03	1.6508+03	1.6491+03	1.4362+03
37	1.6475+03	1.6498+03	1.6478+03	1.6506+03	1.6486+03	1.4272+03
38	1.6445+03	1.6471+03	1.6449+03	1.6475+03	1.6458+03	1.3941+03
39	1.6556+03	1.6585+03	1.6560+03	1.6588+03	1.6570+03	1.3834+03
40	1.6466+03	1.6495+03	1.6470+03	1.6497+03	1.6479+03	1.3774+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	867	868	869	870	871	872
	SIT-I	SOT-I	SOT-I	BI 13	BI 21	BI 35
1	1.0546+03	1.1241+03	1.1252+03	1.2080+03	1.2226+03	1.2218+03
2	1.2067+03	1.2940+03	1.2948+03	1.3099+03	1.3518+03	1.3837+03
3	1.4244+03	1.4857+03	1.4865+03	1.4912+03	1.5135+03	1.5297+03
4	1.6951+03	1.7603+03	1.7616+03	1.7610+03	1.7658+03	1.7697+03
5	1.5911+03	1.7155+03	1.7160+03	1.7170+03	1.7297+03	1.7403+03
6	1.6136+03	1.7323+03	1.7328+03	1.7339+03	1.7449+03	1.7541+03
7	1.5937+03	1.7173+03	1.7179+03	1.7171+03	1.7252+03	1.7316+03
8	1.6049+03	1.7309+03	1.7313+03	1.7294+03	1.7336+03	1.7359+03
9	1.6008+03	1.7311+03	1.7316+03	1.7301+03	1.7320+03	1.7329+03
10	1.5587+03	1.6969+03	1.6962+03	1.6948+03	1.6990+03	1.7022+03
11	1.5402+03	1.6972+03	1.6975+03	1.6958+03	1.7008+03	1.7041+03
12	1.5402+03	1.7014+03	1.7023+03	1.6995+03	1.7056+03	1.7079+03
13	1.5248+03	1.6983+03	1.6986+03	1.6988+03	1.7025+03	1.7057+03
14	1.5047+03	1.7030+03	1.7032+03	1.7033+03	1.7070+03	1.7098+03
15	1.4967+03	1.7160+03	1.7163+03	1.7169+03	1.7200+03	1.7218+03
16	1.4967+03	1.7166+03	1.7171+03	1.7162+03	1.7189+03	1.7198+03
17	1.5154+03	1.7277+03	1.7286+03	1.7281+03	1.7286+03	1.7290+03
18	1.5212+03	1.7122+03	1.7125+03	1.7115+03	1.7124+03	1.7129+03
19	1.4007+03	1.7129+03	1.7138+03	1.7119+03	1.7119+03	1.7115+03
20	1.5180+03	1.6476+03	1.6485+03	1.6476+03	1.6498+03	1.6515+03
21	1.4970+03	1.6090+03	1.6092+03	1.6086+03	1.6099+03	1.6139+03
22	1.4326+03	1.5459+03	1.5468+03	1.5494+03	1.5674+03	1.5792+03
23	1.4396+03	1.5605+03	1.5607+03	1.5624+03	1.5734+03	1.5817+03
24	1.4239+03	1.5350+03	1.5357+03	1.5376+03	1.5480+03	1.5559+03
25	1.4374+03	1.5512+03	1.5522+03	1.5535+03	1.5609+03	1.5680+03
26	1.4816+03	1.5682+03	1.5691+03	1.5683+03	1.5718+03	1.5757+03
27	1.4780+03	1.5855+03	1.5859+03	1.5855+03	1.6122+03	1.6192+03
28	1.4572+03	1.5859+03	1.5863+03	1.5862+03	1.5894+03	1.5926+03
29	1.4780+03	1.5464+03	1.5470+03	1.5518+03	1.5759+03	1.5940+03
30	1.5046+03	1.5648+03	1.5653+03	1.5673+03	1.5858+03	1.6014+03
31	1.5488+03	1.6098+03	1.6108+03	1.6122+03	1.6227+03	1.6331+03
32	1.5228+03	1.5778+03	1.5781+03	1.5783+03	1.5878+03	1.5979+03
33	1.4967+03	1.5497+03	1.5501+03	1.5503+03	1.5564+03	1.5644+03
34	1.4777+03	1.5425+03	1.5436+03	1.5430+03	1.5482+03	1.5548+03
35	1.3970+03	1.5099+03	1.5107+03	1.5114+03	1.5210+03	1.5285+03
36	1.4359+03	1.5878+03	1.5885+03	1.5889+03	1.5958+03	1.6013+03
37	1.4277+03	1.5719+03	1.5723+03	1.5726+03	1.5831+03	1.5923+03
38	1.3936+03	1.5667+03	1.5676+03	1.5673+03	1.5795+03	1.5885+03
39	1.3825+03	1.5805+03	1.5814+03	1.5813+03	1.5918+03	1.6006+03
40	1.3769+03	1.5761+03	1.5770+03	1.5771+03	1.5860+03	1.5943+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	873	874	875	876	211	213
	BI 49	BI 63	BI 77	BI 91	BB	BB
1	1.2205+03	1.2159+03	1.2030+03	1.1506+03	1.0689+03	1.0640+03
2	1.3879+03	1.3670+03	1.3502+03	1.2877+03	1.2227+03	1.2172+03
3	1.5398+03	1.5476+03	1.5310+03	1.4846+03	1.4381+03	1.4332+03
4	1.7727+03	1.7753+03	1.7723+03	1.7380+03	1.7078+03	1.7027+03
5	1.7540+03	1.7485+03	1.7494+03	1.7311+03	1.6063+03	1.5985+03
6	1.7632+03	1.7614+03	1.7623+03	1.7422+03	1.6296+03	1.6221+03
7	1.7362+03	1.7380+03	1.7390+03	1.7143+03	1.6087+03	1.6013+03
8	1.7386+03	1.7400+03	1.7414+03	1.7094+03	1.6187+03	1.6115+03
9	1.7347+03	1.7352+03	1.7389+03	1.6990+03	1.6141+03	1.6076+03
10	1.7036+03	1.7068+03	1.7073+03	1.6791+03	1.5717+03	1.5646+03
11	1.7073+03	1.7082+03	1.7082+03	1.6826+03	1.5567+03	1.5492+03
12	1.7106+03	1.7116+03	1.7125+03	1.6862+03	1.5560+03	1.5480+03
13	1.7090+03	1.7094+03	1.6997+03	1.6872+03	1.5420+03	1.5337+03
14	1.7125+03	1.7135+03	1.7130+03	1.6937+03	1.5243+03	1.5151+03
15	1.7237+03	1.7241+03	1.7214+03	1.7044+03	1.5157+03	1.5061+03
16	1.7193+03	1.7216+03	1.7216+03	1.7024+03	1.5168+03	1.5067+03
17	1.7304+03	1.7304+03	1.7304+03	1.7025+03	1.5345+03	1.5249+03
18	1.7138+03	1.7138+03	1.7138+03	1.6913+03	1.5392+03	1.5299+03
19	1.7119+03	1.7119+03	1.7110+03	1.7069+03	1.4252+03	1.4096+03
20	1.6537+03	1.6550+03	1.6621+03	1.6208+03	1.5326+03	1.5265+03
21	1.6174+03	1.6196+03	1.6231+03	1.5813+03	1.5102+03	1.5045+03
22	1.5864+03	1.5901+03	1.6078+03	1.5542+03	1.4482+03	1.4416+03
23	1.5872+03	1.5908+03	1.6050+03	1.5549+03	1.4556+03	1.4490+03
24	1.5612+03	1.5647+03	1.5748+03	1.5283+03	1.4398+03	1.4341+03
25	1.5724+03	1.5750+03	1.5838+03	1.5391+03	1.4545+03	1.4479+03
26	1.5788+03	1.5814+03	1.5851+03	1.5499+03	1.4949+03	1.4901+03
27	1.6214+03	1.6209+03	1.6065+03	1.5599+03	1.4953+03	1.4901+03
28	1.5972+03	1.6080+03	1.6124+03	1.5764+03	1.4753+03	1.4691+03
29	1.6045+03	1.6102+03	1.6004+03	1.5527+03	1.4925+03	1.4872+03
30	1.6112+03	1.6169+03	1.6050+03	1.5585+03	1.5185+03	1.5133+03
31	1.6417+03	1.6459+03	1.6390+03	1.5979+03	1.5627+03	1.5574+03
32	1.6052+03	1.6100+03	1.5988+03	1.5630+03	1.5367+03	1.5323+03
33	1.5697+03	1.5731+03	1.5578+03	1.5285+03	1.5094+03	1.5059+03
34	1.5601+03	1.5676+03	1.5526+03	1.5206+03	1.4911+03	1.4871+03
35	1.5334+03	1.5360+03	1.5473+03	1.5066+03	1.4136+03	1.4082+03
36	1.6058+03	1.6075+03	1.6049+03	1.5772+03	1.4520+03	1.4445+03
37	1.5973+03	1.6001+03	1.5991+03	1.5786+03	1.4437+03	1.4358+03
38	1.5936+03	1.5959+03	1.5959+03	1.5769+03	1.4117+03	1.4029+03
39	1.6051+03	1.6068+03	1.6064+03	1.5932+03	1.4013+03	1.3915+03
40	1.5993+03	1.6007+03	1.5998+03	1.5855+03	1.3955+03	1.3864+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	215 BB	222 PIT-A	225 POT-A	228 SIT-A	230 SOT-A	233 PFMST
1	1.0640+03	1.2255+03	1.2193+03	1.0549+03	1.1247+03	1.2112+03
2	1.2168+03	1.4033+03	1.3881+03	1.2067+03	1.2944+03	1.3819+03
3	1.4332+03	1.5836+03	1.5673+03	1.4245+03	1.4861+03	1.5613+03
4	1.7027+03	1.8248+03	1.8073+03	1.6951+03	1.7610+03	1.8033+03
5	1.5975+03	1.8406+03	1.8064+03	1.5910+03	1.7158+03	1.8023+03
6	1.6217+03	1.8500+03	1.8179+03	1.6135+03	1.7325+03	1.8148+03
7	1.6008+03	1.8129+03	1.7865+03	1.5936+03	1.7176+03	1.7823+03
8	1.6115+03	1.7965+03	1.7776+03	1.6047+03	1.7311+03	1.7740+03
9	1.6076+03	1.7755+03	1.7624+03	1.6005+03	1.7314+03	1.7592+03
10	1.5642+03	1.7609+03	1.7427+03	1.5579+03	1.6965+03	1.7389+03
11	1.5484+03	1.7621+03	1.7434+03	1.5400+03	1.6973+03	1.7408+03
12	1.5480+03	1.7658+03	1.7470+03	1.5405+03	1.7018+03	1.7441+03
13	1.5332+03	1.7641+03	1.7447+03	1.5249+03	1.6985+03	1.7420+03
14	1.5138+03	1.7671+03	1.7478+03	1.5047+03	1.7031+03	1.7451+03
15	1.5052+03	1.7750+03	1.7562+03	1.4969+03	1.7162+03	1.7540+03
16	1.5054+03	1.7688+03	1.7518+03	1.4968+03	1.7169+03	1.7487+03
17	1.5235+03	1.7666+03	1.7536+03	1.5156+03	1.7282+03	1.7502+03
18	1.5291+03	1.7456+03	1.7346+03	1.5212+03	1.7124+03	1.7312+03
19	1.4079+03	1.7412+03	1.7303+03	1.4012+03	1.7133+03	1.7270+03
20	1.5260+03	1.6888+03	1.6769+03	1.5183+03	1.6481+03	1.6741+03
21	1.5045+03	1.6519+03	1.6403+03	1.4968+03	1.6091+03	1.6358+03
22	1.4412+03	1.6487+03	1.6263+03	1.4326+03	1.5464+03	1.6239+03
23	1.4481+03	1.6406+03	1.6215+03	1.4394+03	1.5606+03	1.6185+03
24	1.4332+03	1.6076+03	1.5911+03	1.4240+03	1.5354+03	1.5876+03
25	1.4475+03	1.6146+03	1.5995+03	1.4376+03	1.5517+03	1.5974+03
26	1.4896+03	1.6122+03	1.6015+03	1.4818+03	1.5686+03	1.5977+03
27	1.4892+03	1.6389+03	1.6280+03	1.4777+03	1.5857+03	1.6248+03
28	1.4683+03	1.6398+03	1.6270+03	1.4569+03	1.5861+03	1.6241+03
29	1.4872+03	1.6659+03	1.6416+03	1.4780+03	1.5467+03	1.6383+03
30	1.5137+03	1.6654+03	1.6437+03	1.5045+03	1.5651+03	1.6412+03
31	1.5574+03	1.6921+03	1.6731+03	1.5490+03	1.6103+03	1.6707+03
32	1.5319+03	1.6448+03	1.6302+03	1.5226+03	1.5779+03	1.6270+03
33	1.5059+03	1.5955+03	1.5856+03	1.4964+03	1.5499+03	1.5803+03
34	1.4871+03	1.5868+03	1.5767+03	1.4777+03	1.5430+03	1.5712+03
35	1.4077+03	1.5766+03	1.5621+03	1.3971+03	1.5103+03	1.5561+03
36	1.4436+03	1.6549+03	1.6371+03	1.4361+03	1.5882+03	1.6338+03
37	1.4358+03	1.6552+03	1.6347+03	1.4275+03	1.5721+03	1.6313+03
38	1.4021+03	1.6526+03	1.6311+03	1.3939+03	1.5672+03	1.6282+03
39	1.3907+03	1.6642+03	1.6420+03	1.3829+03	1.5809+03	1.6394+03
40	1.3855+03	1.6553+03	1.6341+03	1.3772+03	1.5766+03	1.6310+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	235	237	239	243	247	249
	PFMMT	SFMST	SFMMT	PFLO	SFLO	G-NA
1	1.6977+02	1.0551+03	1.2863+02	6.7972+00	3.6839-01	1.3710+07
2	1.8373+02	1.2067+03	1.2742+02	7.0061+00	5.9219-01	1.4131+07
3	1.9456+02	1.4245+03	1.3044+02	6.9004+00	6.3215-01	1.3918+07
4	2.3017+02	1.6951+03	1.4802+02	6.7256+00	6.8956-01	1.3566+07
5	2.2085+02	1.5909+03	1.3605+02	6.7343+00	3.2190-01	1.3583+07
6	2.1830+02	1.6133+03	1.3482+02	6.7712+00	3.3627-01	1.3658+07
7	2.2138+02	1.5935+03	1.4230+02	6.7740+00	3.2224-01	1.3663+07
8	2.3657+02	1.6046+03	1.5913+02	6.7815+00	3.2128-01	1.3678+07
9	2.4560+02	1.6002+03	1.6419+02	6.8438+00	3.2113-01	1.3804+07
10	2.4262+02	1.5570+03	1.6106+02	6.8816+00	2.7779-01	1.3880+07
11	2.3970+02	1.5399+03	1.5712+02	6.8582+00	2.5762-01	1.3833+07
12	2.3603+02	1.5407+03	1.5239+02	6.8539+00	2.3839-01	1.3824+07
13	2.3197+02	1.5249+03	1.4947+02	6.9141+00	2.1004-01	1.3946+07
14	2.2670+02	1.5047+03	1.4234+02	6.9089+00	1.9432-01	1.3935+07
15	2.2470+02	1.4972+03	1.3770+02	6.7796+00	1.7288-01	1.3674+07
16	2.2140+02	1.4970+03	1.3440+02	6.8352+00	1.6861-01	1.3787+07
17	2.1403+02	1.5157+03	1.3187+02	6.8230+00	1.7763-01	1.3762+07
18	2.0943+02	1.5212+03	1.3123+02	6.8113+00	1.6933-01	1.3738+07
19	2.3216+02	1.4017+03	1.4307+02	6.8278+00	8.7078-02	1.3772+07
20	2.3729+02	1.5185+03	1.6075+02	6.9207+00	2.7999-01	1.3959+07
21	2.3229+02	1.4965+03	1.5860+02	6.9505+00	3.2313-01	1.4019+07
22	2.2232+02	1.4327+03	1.4720+02	6.9860+00	3.1493-01	1.4091+07
23	2.1557+02	1.4392+03	1.4133+02	6.8473+00	3.0261-01	1.3811+07
24	2.0683+02	1.4240+03	1.3567+02	6.9308+00	3.1619-01	1.3979+07
25	2.0529+02	1.4377+03	1.3457+02	6.8954+00	3.0443-01	1.3908+07
26	2.1841+02	1.4820+03	1.5121+02	6.9101+00	3.3470-01	1.3938+07
27	2.1266+02	1.4775+03	1.4370+02	7.0757+00	3.8465-01	1.4272+07
28	2.1154+02	1.4566+03	1.4082+02	7.0754+00	2.7800-01	1.4271+07
29	2.1376+02	1.4780+03	1.4128+02	6.9167+00	6.0947-01	1.3951+07
30	2.1385+02	1.5044+03	1.4181+02	6.8669+00	6.4836-01	1.3851+07
31	2.1442+02	1.5492+03	1.4634+02	6.8747+00	6.1793-01	1.3866+07
32	2.1574+02	1.5225+03	1.5250+02	6.9661+00	6.3848-01	1.4051+07
33	2.1445+02	1.4962+03	1.5209+02	6.8578+00	6.2896-01	1.3832+07
34	2.1412+02	1.4778+03	1.5176+02	6.8640+00	5.0485-01	1.3845+07
35	2.1359+02	1.3973+03	1.5035+02	6.9297+00	2.6122-01	1.3977+07
36	2.1680+02	1.4362+03	1.4916+02	6.7631+00	2.3169-01	1.3641+07
37	2.1693+02	1.4272+03	1.4797+02	6.8404+00	2.2087-01	1.3797+07
38	2.1601+02	1.3941+03	1.4485+02	6.9518+00	1.9055-01	1.4022+07
39	2.1522+02	1.3834+03	1.4274+02	6.9445+00	1.9022-01	1.4007+07
40	2.1225+02	1.3774+03	1.3801+02	6.8239+00	1.6313-01	1.3764+07

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	251 G-K	255 BOP	258 VPKC	270 BIP	271 DPB-G	272 TSATKI
1	3.2827+05	4.7151+00	2.9187+00	6.4379+00	1.7228+00	1.2461+03
2	5.2770+05	8.9899+00	8.5854+00	1.5561+01	6.5714+00	1.4047+03
3	5.6330+05	2.3011+01	2.3156+01	3.2293+01	9.2820+00	1.5602+03
4	6.1446+05	7.1409+01	7.0944+01	7.7764+01	6.3545+00	1.7871+03
5	2.8684+05	6.0526+01	6.0206+01	7.0164+01	9.6374+00	1.7579+03
6	2.9964+05	6.4384+01	6.4037+01	7.3762+01	9.3777+00	1.7721+03
7	2.8715+05	6.0699+01	6.0608+01	6.8321+01	7.6225+00	1.7506+03
8	2.8629+05	6.3434+01	6.3698+01	6.8897+01	5.4631+00	1.7529+03
9	2.8616+05	6.3204+01	6.3755+01	6.7343+01	4.1390+00	1.7465+03
10	2.4753+05	5.5775+01	5.6007+01	6.1154+01	5.3781+00	1.7200+03
11	2.2956+05	5.6380+01	5.6172+01	6.1153+01	4.7733+00	1.7200+03
12	2.1243+05	5.6754+01	5.7123+01	6.1556+01	4.8020+00	1.7219+03
13	1.8717+05	5.6524+01	5.6403+01	6.0203+01	3.6793+00	1.7157+03
14	1.7315+05	5.6870+01	5.7406+01	6.0807+01	3.9380+00	1.7185+03
15	1.5405+05	6.0152+01	6.0294+01	6.3110+01	2.9584+00	1.7286+03
16	1.5024+05	6.0382+01	6.0451+01	6.3053+01	2.6705+00	1.7284+03
17	1.5828+05	6.2714+01	6.3002+01	6.4953+01	2.2383+00	1.7364+03
18	1.5089+05	5.9173+01	5.9455+01	6.1527+01	2.3544+00	1.7217+03
19	7.7594+04	5.9288+01	5.9665+01	6.1727+01	2.4392+00	1.7226+03
20	2.4950+05	4.6232+01	4.6424+01	5.0318+01	4.0861+00	1.6685+03
21	2.8794+05	3.9446+01	3.9689+01	4.3729+01	4.2830+00	1.6329+03
22	2.8063+05	3.0736+01	3.0398+01	3.8442+01	7.7064+00	1.6015+03
23	2.6965+05	3.2215+01	3.2360+01	3.8442+01	6.2275+00	1.6015+03
24	2.8176+05	2.8579+01	2.8975+01	3.4540+01	5.9617+00	1.5761+03
25	2.7127+05	3.0612+01	3.1104+01	3.6028+01	5.4159+00	1.5858+03
26	2.9825+05	3.3170+01	3.3485+01	3.7769+01	4.5993+00	1.5972+03
27	3.4275+05	3.5984+01	3.6018+01	4.0941+01	4.9572+00	1.6167+03
28	2.4772+05	3.6123+01	3.6068+01	4.0239+01	4.1156+00	1.6124+03
29	5.4309+05	3.1013+01	3.0440+01	4.1839+01	1.0826+01	1.6221+03
30	5.7774+05	3.3833+01	3.2982+01	4.2850+01	9.0165+00	1.6280+03
31	5.5063+05	4.0172+01	3.9889+01	4.7876+01	7.7040+00	1.6558+03
32	5.6895+05	3.5006+01	3.4829+01	4.2457+01	7.4509+00	1.6258+03
33	5.6046+05	3.0828+01	3.0851+01	3.6759+01	5.9307+00	1.5906+03
34	4.4986+05	2.9688+01	2.9966+01	3.5467+01	5.7794+00	1.5821+03
35	2.3277+05	2.5343+01	2.5887+01	3.0783+01	5.4395+00	1.5494+03
36	2.0645+05	3.6207+01	3.6391+01	4.1137+01	4.9298+00	1.6178+03
37	1.9682+05	3.4392+01	3.3974+01	4.0154+01	5.7624+00	1.6119+03
38	1.6980+05	3.3262+01	3.3280+01	3.9368+01	6.1056+00	1.6071+03
39	1.6950+05	3.5090+01	3.5286+01	4.1080+01	5.9900+00	1.6175+03
40	1.4536+05	3.4336+01	3.4619+01	3.9676+01	5.3405+00	1.6090+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	279	284	287	291	703	705
	QL	QPRI	DT-SC	QSC	QUAL-B	VFV-B
1	1.0862+00	1.1466+01	1.9124+02	1.3249+01	2.0649-02	1.1596+00
2	1.4953+00	3.0523+01	1.9799+02	2.2653+01	4.0782-02	1.2810+00
3	1.9996+00	3.2497+01	1.3569+02	1.7383+01	4.7569-02	6.4490-01
4	2.8119+00	3.4401+01	9.1969+01	1.3762+01	4.7098-02	2.5452-01
5	2.8459+00	6.9632+01	1.6689+02	1.1455+01	2.4719-01	7.2346-01
6	2.8843+00	6.5605+01	1.5862+02	1.1437+01	2.2220-01	6.4210-01
7	2.7548+00	5.3367+01	1.5700+02	1.0784+01	1.8148-01	5.2840-01
8	2.7060+00	3.7551+01	1.4815+02	1.0170+01	1.1773-01	3.2659-01
9	2.6385+00	2.5298+01	1.4599+02	1.0002+01	6.6659-02	1.8468-01
10	2.5794+00	3.6485+01	1.6218+02	9.5106+00	1.3217-01	3.5708-01
11	2.5830+00	3.7413+01	1.7999+02	9.7599+00	1.4522-01	3.6289-01
12	2.5959+00	3.7638+01	1.8141+02	9.1060+00	1.6069-01	3.6592-01
13	2.5891+00	3.9317+01	1.9088+02	8.4101+00	1.9527-01	3.9638-01
14	2.5999+00	3.9088+01	2.1375+02	8.6918+00	2.0708-01	3.8258-01
15	2.6286+00	3.7244+01	2.3171+02	8.3885+00	2.2087-01	3.4668-01
16	2.6093+00	3.3721+01	2.3155+02	8.1752+00	2.0059-01	3.0633-01
17	2.6071+00	2.5062+01	2.2086+02	8.2453+00	1.2614-01	1.9533-01
18	2.5358+00	2.0908+01	2.0057+02	7.1280+00	1.0847-01	1.6897-01
19	2.5206+00	2.0600+01	3.2147+02	5.7836+00	2.2396-01	1.7882-01
20	2.3406+00	2.3031+01	1.5023+02	8.7261+00	7.0518-02	2.2837-01
21	2.2197+00	2.2703+01	1.3618+02	9.0650+00	5.9406-02	2.5412-01
22	2.1955+00	4.6046+01	1.6887+02	1.0843+01	1.5245-01	8.1064-01
23	2.1738+00	3.8075+01	1.6210+02	1.0010+01	1.2573-01	6.0618-01
24	2.0730+00	3.2899+01	1.5209+02	9.7682+00	1.0061-01	5.5939-01
25	2.0967+00	2.9840+01	1.4824+02	9.1913+00	9.2811-02	4.6748-01
26	2.0946+00	2.0714+01	1.1542+02	7.9154+00	5.4979-02	2.8378-01
27	2.1789+00	2.1711+01	1.3892+02	1.0963+01	4.2954-02	2.3844-01
28	2.1792+00	2.5581+01	1.5550+02	8.8498+00	8.2101-02	3.2898-01
29	2.2488+00	4.9520+01	1.4411+02	1.8035+01	8.3260-02	8.5580-01
30	2.2506+00	4.3678+01	1.2351+02	1.6495+01	6.8396-02	6.9381-01
31	2.3421+00	3.8080+01	1.0676+02	1.3738+01	6.1622-02	5.0182-01
32	2.1929+00	2.9151+01	1.0315+02	1.3589+01	4.2817-02	4.0641-01
33	2.0438+00	1.8699+01	9.4178+01	1.2141+01	2.3353-02	2.4490-01
34	2.0167+00	1.9035+01	1.0439+02	1.0778+01	3.0197-02	2.6055-01
35	1.9806+00	2.8730+01	1.5222+02	8.0080+00	1.0706-01	5.4302-01
36	2.2215+00	3.4890+01	1.8178+02	8.6023+00	1.4969-01	4.9594-01
37	2.2188+00	4.0989+01	1.8442+02	8.3082+00	1.9464-01	6.5384-01
38	2.2093+00	4.3871+01	2.1326+02	8.2428+00	2.4297-01	7.1819-01
39	2.2459+00	4.5187+01	2.3456+02	9.0453+00	2.4678-01	6.8987-01
40	2.2184+00	4.2414+01	2.3180+02	7.6538+00	2.7422-01	6.6856-01

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	707	713	715	717	720	721
	VVEL-B	VCIT-I	VCIT-I	VCIT-A	VCOT-I	VCOT-I
1	2.8704+02	1.1206+03	1.1203+03	1.1205+03	1.0979+03	1.1152+03
2	3.1707+02	1.2903+03	1.2888+03	1.2896+03	1.2448+03	1.2488+03
3	1.5963+02	1.4835+03	1.4821+03	1.4828+03	1.4709+03	1.4742+03
4	6.3001+01	1.7580+03	1.7569+03	1.7574+03	1.7537+03	1.7575+03
5	1.7907+02	1.7117+03	1.7117+03	1.7117+03	1.7066+03	1.7086+03
6	1.5894+02	1.7291+03	1.7283+03	1.7287+03	1.7239+03	1.7268+03
7	1.3379+02	1.7135+03	1.7140+03	1.7137+03	1.7094+03	1.7121+03
8	8.0839+01	1.7280+03	1.7283+03	1.7282+03	1.7236+03	1.7274+03
9	4.5712+01	1.7274+03	1.7283+03	1.7279+03	1.7230+03	1.7277+03
10	8.8386+01	1.6915+03	1.6921+03	1.6918+03	1.6870+03	1.6911+03
11	8.9825+01	1.6935+03	1.6940+03	1.6938+03	1.6888+03	1.6934+03
12	9.0573+01	1.6977+03	1.6980+03	1.6978+03	1.6937+03	1.6977+03
13	9.8113+01	1.6961+03	1.6948+03	1.6954+03	1.6919+03	1.6954+03
14	9.4699+01	1.6996+03	1.6993+03	1.6994+03	1.6970+03	1.6986+03
15	8.5813+01	1.7135+03	1.7124+03	1.7129+03	1.7108+03	1.7130+03
16	7.5824+01	1.7141+03	1.7144+03	1.7143+03	1.7111+03	1.7132+03
17	4.8349+01	1.7253+03	1.7250+03	1.7252+03	1.7222+03	1.7245+03
18	4.1825+01	1.7082+03	1.7079+03	1.7081+03	1.7063+03	1.7084+03
19	4.4264+01	1.7113+03	1.7102+03	1.7107+03	1.7058+03	1.7108+03
20	5.6528+01	1.6445+03	1.6450+03	1.6448+03	1.6397+03	1.6442+03
21	6.2900+01	1.6057+03	1.6062+03	1.6059+03	1.6015+03	1.6059+03
22	2.0065+02	1.5428+03	1.5418+03	1.5423+03	1.5350+03	1.5383+03
23	1.5004+02	1.5577+03	1.5561+03	1.5569+03	1.5521+03	1.5554+03
24	1.3846+02	1.5334+03	1.5319+03	1.5326+03	1.5279+03	1.5315+03
25	1.1571+02	1.5484+03	1.5472+03	1.5478+03	1.5438+03	1.5471+03
26	7.0242+01	1.5664+03	1.5654+03	1.5659+03	1.5600+03	1.5659+03
27	5.9019+01	1.5811+03	1.5815+03	1.5813+03	1.5776+03	1.5811+03
28	8.1430+01	1.5829+03	1.5816+03	1.5823+03	1.5792+03	1.5824+03
29	2.1183+02	1.5427+03	1.5427+03	1.5427+03	1.5297+03	1.5337+03
30	1.7174+02	1.5618+03	1.5616+03	1.5617+03	1.5518+03	1.5559+03
31	1.2421+02	1.6067+03	1.6062+03	1.6064+03	1.6015+03	1.6033+03
32	1.0060+02	1.5743+03	1.5748+03	1.5746+03	1.5691+03	1.5734+03
33	6.0620+01	1.5456+03	1.5461+03	1.5458+03	1.5352+03	1.5456+03
34	6.4493+01	1.5383+03	1.5389+03	1.5386+03	1.5268+03	1.5387+03
35	1.3441+02	1.5069+03	1.5055+03	1.5062+03	1.4920+03	1.5049+03
36	1.2276+02	1.5849+03	1.5855+03	1.5852+03	1.5727+03	1.5842+03
37	1.6184+02	1.5685+03	1.5672+03	1.5678+03	1.5541+03	1.5661+03
38	1.7777+02	1.5643+03	1.5638+03	1.5640+03	1.5490+03	1.5626+03
39	1.7076+02	1.5776+03	1.5779+03	1.5777+03	1.5725+03	1.5764+03
40	1.6549+02	1.5742+03	1.5729+03	1.5735+03	1.5682+03	1.5719+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	722	724	727	730	732	733
	VCOT-I	VCOT-A	VP VCI	DPVC	HCOT-I	HCOT-I
1	1.1136+03	1.1089+03	2.8324+00	2.3851-01	1.1127+03	1.1124+03
2	1.2479+03	1.2472+03	8.3663+00	1.8908+00	1.2469+03	1.2432+03
3	1.4728+03	1.4726+03	2.2800+01	1.0829+00	1.4712+03	1.4702+03
4	1.7566+03	1.7559+03	7.0053+01	3.7995-01	1.7556+03	1.7562+03
5	1.7092+03	1.7081+03	5.9319+01	7.9958-01	1.7033+03	1.7004+03
6	1.7258+03	1.7255+03	6.3138+01	7.7024-01	1.7215+03	1.7184+03
7	1.7125+03	1.7113+03	5.9756+01	5.3141-01	1.7100+03	1.7092+03
8	1.7279+03	1.7263+03	6.3006+01	4.5039-01	1.7250+03	1.7244+03
9	1.7282+03	1.7263+03	6.2931+01	3.7477-01	1.7244+03	1.7258+03
10	1.6923+03	1.6901+03	5.5025+01	3.3882-01	1.6911+03	1.6896+03
11	1.6943+03	1.6921+03	5.5435+01	3.3335-01	1.6929+03	1.6910+03
12	1.6985+03	1.6966+03	5.6275+01	2.5248-01	1.6975+03	1.6956+03
13	1.6943+03	1.6939+03	5.5780+01	3.1751-01	1.6940+03	1.6923+03
14	1.6994+03	1.6984+03	5.6605+01	2.1996-01	1.7001+03	1.6975+03
15	1.7125+03	1.7121+03	5.9582+01	1.8058-01	1.7136+03	1.7108+03
16	1.7140+03	1.7127+03	5.9879+01	3.3785-01	1.7130+03	1.7114+03
17	1.7247+03	1.7238+03	6.2293+01	3.0568-01	1.7226+03	1.7220+03
18	1.7084+03	1.7077+03	5.8508+01	8.2584-02	1.7092+03	1.7060+03
19	1.7098+03	1.7088+03	5.9091+01	4.1815-01	1.7097+03	1.7087+03
20	1.6452+03	1.6430+03	4.5840+01	3.1056-01	1.6431+03	1.6415+03
21	1.6062+03	1.6045+03	3.9171+01	2.3612-01	1.6033+03	1.6024+03
22	1.5381+03	1.5371+03	2.9874+01	6.7456-01	1.5358+03	1.5324+03
23	1.5547+03	1.5541+03	3.1833+01	3.9186-01	1.5544+03	1.5518+03
24	1.5301+03	1.5298+03	2.8619+01	3.5907-01	1.5287+03	1.5274+03
25	1.5469+03	1.5459+03	3.0580+01	2.4242-01	1.5472+03	1.5449+03
26	1.5648+03	1.5635+03	3.3100+01	3.2997-01	1.5639+03	1.5651+03
27	1.5821+03	1.5803+03	3.5339+01	1.5645-01	1.5793+03	1.5798+03
28	1.5816+03	1.5811+03	3.5488+01	1.8143-01	[illegible]	1.5802+03
29	1.5324+03	1.5319+03	2.9916+01	1.3865+00	1.5269+03	1.5259+03
30	1.5547+03	1.5541+03	3.2513+01	1.0642+00	1.5508+03	1.5500+03
31	1.6044+03	1.6030+03	3.9251+01	5.5689-01	1.6010+03	1.5997+03
32	1.5724+03	1.5716+03	3.4319+01	4.1364-01	1.5701+03	1.5693+03
33	1.5466+03	1.5424+03	3.0327+01	4.3916-01	1.5425+03	1.5462+03
34	1.5394+03	1.5350+03	2.9389+01	4.6712-01	1.5355+03	1.5353+03
35	1.5057+03	1.5009+03	2.5403+01	6.3102-01	1.5044+03	1.5034+03
36	1.5845+03	1.5805+03	3.5935+01	7.1787-01	1.5826+03	1.5813+03
37	1.5662+03	1.5621+03	3.3374+01	8.0368-01	1.5652+03	1.5631+03
38	1.5611+03	1.5576+03	3.2836+01	9.0267-01	1.5610+03	1.5584+03
39	1.5756+03	1.5749+03	3.4795+01	4.3480-01	1.5748+03	1.5729+03
40	1.5709+03	1.5703+03	3.4171+01	4.4780-01	1.5721+03	1.5696+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	735	737	739	741	746	747
	HCOT-A	HCAIT	HCAIT	HCAITA	HCAOTS	HCAOT-NE
1	1.1126+03	3.1876+02	3.1565+02	3.1720+02	5.3337+02	5.4393+02
2	1.2451+03	1.0549+02	1.0065+02	1.0307+02	1.1251+03	1.1239+03
3	1.4707+03	1.0685+02	9.9814+01	1.0333+02	1.3172+03	1.3147+03
4	1.7559+03	2.0774+02	1.5462+02	1.8118+02	1.3621+03	1.3587+03
5	1.7018+03	8.4150+01	7.7110+01	8.0630+01	1.5207+03	1.5189+03
6	1.7200+03	8.7450+01	8.0410+01	8.3930+01	1.5390+03	1.5376+03
7	1.7096+03	1.1055+02	1.0219+02	1.0637+02	1.5211+03	1.5194+03
8	1.7247+03	1.5888+02	1.3864+02	1.4876+02	1.4450+03	1.4441+03
9	1.7251+03	1.2288+03	1.0349+03	1.1319+03	3.3976+02	3.5770+02
10	1.6903+03	1.4951+02	1.3235+02	1.4093+02	1.4299+03	1.4281+03
11	1.6919+03	1.4527+02	1.2811+02	1.3669+02	1.4305+03	1.4287+03
12	1.6966+03	1.4025+02	1.2353+02	1.3189+02	1.4338+03	1.4320+03
13	1.6931+03	1.3325+02	1.1785+02	1.2555+02	1.4387+03	1.4383+03
14	1.6988+03	1.2696+02	1.1200+02	1.1948+02	1.4403+03	1.4403+03
15	1.7122+03	1.4161+02	1.1873+02	1.3017+02	1.4137+03	1.4116+03
16	1.7122+03	1.6344+02	1.2912+02	1.4628+02	1.3705+03	1.3688+03
17	1.7223+03	1.2305+03	1.0147+03	1.1226+03	3.5540+02	3.6230+02
18	1.7076+03	1.2238+03	1.0093+03	1.1165+03	2.9699+02	3.1857+02
19	1.7092+03	1.2295+03	1.0280+03	1.1287+03	3.0779+02	3.3125+02
20	1.6423+03	1.1760+03	9.7170+02	1.0738+03	3.2343+02	3.3769+02
21	1.6029+03	1.1463+03	9.3658+02	1.0415+03	3.2269+02	3.3833+02
22	1.5341+03	1.1092+02	1.0476+02	1.0784+02	1.3734+03	1.3725+03
23	1.5531+03	1.1660+02	1.0648+02	1.1154+02	1.3640+03	1.3602+03
24	1.5281+03	1.1838+02	1.0562+02	1.1200+02	1.3202+03	1.3198+03
25	1.5461+03	1.3356+02	1.1376+02	1.2366+02	1.2950+03	1.2928+03
26	1.5645+03	2.5223+02	1.9031+02	2.2127+02	1.1676+03	1.1604+03
27	1.5796+03	1.1304+03	8.9341+02	1.0119+03	5.2710+02	5.3722+02
28	1.5816+03	2.7613+02	1.9603+02	2.3608+02	9.7086+02	9.6078+02
29	1.5264+03	1.0263+02	9.6470+01	9.9550+01	1.3692+03	1.3683+03
30	1.5504+03	1.0747+02	9.9110+01	1.0329+02	1.3813+03	1.3783+03
31	1.6003+03	1.2164+02	1.0800+02	1.1482+02	1.3810+03	1.3810+03
32	1.5697+03	1.4971+02	1.2507+02	1.3739+02	1.2945+03	1.2914+03
33	1.5444+03	1.1059+03	8.8488+02	9.9540+02	3.1760+02	3.3277+02
34	1.5354+03	1.1028+03	8.8180+02	9.9230+02	3.1140+02	3.2536+02
35	1.5039+03	1.3266+02	1.1990+02	1.2628+02	1.2977+03	1.2968+03
36	1.5819+03	1.2892+02	1.1528+02	1.2210+02	1.3527+03	1.3514+03
37	1.5642+03	1.1339+02	1.0591+02	1.0965+02	1.3943+03	1.3921+03
38	1.5597+03	1.1150+02	1.0446+02	1.0798+02	1.3871+03	1.3849+03
39	1.5738+03	1.0919+02	1.0171+02	1.0545+02	1.3995+03	1.3974+03
40	1.5708+03	1.0749+02	9.9572+01	1.0353+02	1.3924+03	1.3893+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	748	749	751	755	756	757
	HCAOTN	HCAOTH	HCAOTA	HCCAOT	HCCAOT	HCCAOT
1	5.4129+02	5.0301+02	5.3040+02	1.1381+02	1.1205+02	1.1689+02
2	1.1222+03	1.1132+03	1.1211+03	1.0021+02	9.8890+01	9.9770+01
3	1.3117+03	1.2974+03	1.3102+03	9.8054+01	9.7614+01	9.8054+01
4	1.3481+03	1.3182+03	1.3468+03	1.0842+02	1.0534+02	1.1062+02
5	1.5145+03	1.5053+03	1.5149+03	7.7110+01	7.5790+01	7.5350+01
6	1.5324+03	1.5214+03	1.5326+03	7.9970+01	7.8210+01	7.9090+01
7	1.5128+03	1.4987+03	1.5130+03	1.0087+02	9.9550+01	1.0043+02
8	1.4318+03	1.4125+03	1.4333+03	1.2544+02	1.2324+02	1.2720+02
9	3.0889+02	2.9789+02	3.2606+02	1.2113+02	1.2201+02	1.3609+02
10	1.4171+03	1.4032+03	1.4196+03	1.2179+02	1.2047+02	1.2267+02
11	1.4177+03	1.4046+03	1.4204+03	1.1755+02	1.1667+02	1.1843+02
12	1.4215+03	1.4069+03	1.4236+03	1.1209+02	1.1077+02	1.1341+02
13	1.4264+03	1.4133+03	1.4291+03	1.0817+02	1.0729+02	1.0905+02
14	1.4284+03	1.4148+03	1.4310+03	1.0276+02	1.0144+02	1.0320+02
15	1.4002+03	1.3843+03	1.4024+03	1.0201+02	1.0025+02	1.0377+02
16	1.3558+03	1.3389+03	1.3585+03	1.0140+02	1.0008+02	1.0404+02
17	3.3286+02	3.0713+02	3.3942+02	9.3852+01	9.3852+01	1.0441+02
18	2.6563+02	2.5551+02	2.8418+02	9.5150+01	9.3830+01	1.0439+02
19	2.7659+02	2.7071+02	2.9658+02	1.1431+02	1.1519+02	1.2795+02
20	2.9811+02	2.8625+02	3.1137+02	1.2135+02	1.2311+02	1.3719+02
21	3.0137+02	2.8965+02	3.1301+02	1.1669+02	1.1933+02	1.3121+02
22	1.3666+03	1.3611+03	1.3684+03	1.0344+02	1.0256+02	1.0300+02
23	1.3539+03	1.3431+03	1.3553+03	1.0296+02	1.0120+02	1.0752+02
24	1.3105+03	1.2997+03	1.3125+03	1.0034+02	9.8582+01	1.0034+02
25	1.2825+03	1.2690+03	1.2848+03	1.0232+02	1.0100+02	1.0408+02
26	1.1537+03	1.1298+03	1.1529+03	1.2311+02	1.2179+02	1.2795+02
27	5.0246+02	4.7914+02	5.1148+02	1.0050+02	1.0270+02	1.1282+02
28	9.4608+02	9.3138+02	9.5227+02	1.0859+02	1.0639+02	1.1255+02
29	1.3629+03	1.3582+03	1.3646+03	9.5590+01	9.4710+01	9.4710+01
30	1.3725+03	1.3641+03	1.3741+03	9.7350+01	9.5590+01	9.6470+01
31	1.3709+03	1.3596+03	1.3731+03	1.0228+02	1.0052+02	1.0272+02
32	1.2802+03	1.2668+03	1.2832+03	1.1055+02	1.0747+02	1.1187+02
33	2.9604+02	2.8271+02	3.0728+02	1.1004+02	1.1048+02	1.1840+02
34	2.9048+02	2.7714+02	3.0109+02	1.1088+02	1.1176+02	1.2012+02
35	1.2871+03	1.2757+03	1.2893+03	1.1462+02	1.1286+02	1.1506+02
36	1.3422+03	1.3286+03	1.3437+03	1.0912+02	1.0648+02	1.0956+02
37	1.3868+03	1.3776+03	1.3877+03	1.0415+02	1.0283+02	1.0371+02
38	1.3805+03	1.3709+03	1.3809+03	1.0270+02	1.0138+02	1.0226+02
39	1.3927+03	1.3831+03	1.3932+03	1.0039+02	9.8626+01	9.9946+01
40	1.3840+03	1.3748+03	1.3851+03	9.7372+01	9.5172+01	9.6932+01

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	759	766	770	777	779
	HCCADA	WA	QA	DTLMHC	UCHC
1	1.1425+02	0.	0.	6.8156+02	0.
2	9.9623+01	7.1832-02	1.8397+01	4.5901+02	2.0113+01
3	9.7907+01	5.8741-02	1.8030+01	5.6381+02	1.6048+01
4	1.0812+02	0.	0.	8.6483+02	0.
5	7.6083+01	1.1813-01	4.3534+01	6.6571+02	3.2818+01
6	7.9090+01	1.0656-01	3.9709+01	6.7004+02	2.9741+01
7	1.0028+02	8.6073-02	3.1145+01	6.7073+02	2.3302+01
8	1.2530+02	0.	0.	7.6148+02	0.
9	1.2641+02	0.	-0.	9.4002+02	-0.
10	1.2165+02	4.0155-02	1.3162+01	7.3297+02	9.0117+00
11	1.1755+02	4.0298-02	1.3259+01	7.3563+02	9.0450+00
12	1.1209+02	4.0489-02	1.3404+01	7.3982+02	9.0925+00
13	1.0817+02	4.0755-02	1.3617+01	7.3201+02	9.3351+00
14	1.0247+02	4.0961-02	1.3766+01	7.3899+02	9.3484+00
15	1.0201+02	2.8781-02	9.3730+00	7.8021+02	6.0288+00
16	1.0184+02	2.8690-02	8.8874+00	8.1498+02	5.4726+00
17	9.7372+01	0.	-0.	9.3839+02	-0.
18	9.7790+01	0.	-0.	9.4713+02	-0.
19	1.1915+02	0.	-0.	9.3541+02	-0.
20	1.2722+02	0.	-0.	8.9679+02	-0.
21	1.2241+02	0.	-0.	8.7681+02	-0.
22	1.0300+02	7.3462-02	2.3634+01	5.8642+02	2.0225+01
23	1.0223+02	5.0675-02	1.6077+01	6.2646+02	1.2879+01
24	9.9755+01	4.0920-02	1.2501+01	6.3825+02	9.8288+00
25	1.0247+02	4.0686-02	1.2009+01	6.8514+02	8.7963+00
26	1.2429+02	0.	0.	7.8735+02	0.
27	1.0534+02	0.	-0.	7.9212+02	-0.
28	1.0918+02	0.	0.	9.4231+02	0.
29	9.5003+01	8.6482-02	2.7906+01	5.8262+02	2.4037+01
30	9.6470+01	7.3203-02	2.3744+01	6.0474+02	1.9704+01
31	1.0184+02	5.0530-02	1.6237+01	6.7095+02	1.2145+01
32	1.0996+02	2.4462-02	7.1290+00	7.1258+02	5.0206+00
33	1.1298+02	0.	-0.	8.4565+02	-0.
34	1.1425+02	0.	-0.	8.4165+02	-0.
35	1.1418+02	3.4753-02	1.0278+01	6.2461+02	8.2578+00
36	1.0839+02	3.5043-02	1.0918+01	6.7342+02	8.1360+00
37	1.0356+02	6.8908-02	2.2503+01	6.0536+02	1.8655+01
38	1.0211+02	7.0162-02	2.2810+01	6.0722+02	1.8851+01
39	9.9653+01	7.0315-02	2.3139+01	6.1485+02	1.8886+01
40	9.6492+01	6.2915-02	2.0594+01	6.1991+02	1.6672+01

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	202	203	860	861	862	863
	DATE	TIME	PIT-I	POT-I	PIT-I	PIT-I
1	5.2540+00	5.3000+02	1.6262+03	1.6077+03	1.6254+03	1.6254+03
2	5.2540+00	8.3000+02	1.5944+03	1.5817+03	1.5934+03	1.5933+03
3	5.2540+00	9.3000+02	1.5857+03	1.5741+03	1.5847+03	1.5843+03
4	5.2540+00	1.1000+03	1.5728+03	1.5619+03	1.5720+03	1.5721+03
5	5.2540+00	1.3000+03	1.5594+03	1.5484+03	1.5587+03	1.5583+03
6	5.2540+00	2.0000+03	1.6898+03	1.6661+03	1.6891+03	1.6887+03
7	5.2540+00	2.2300+03	1.7359+03	1.7111+03	1.7353+03	1.7351+03
8	5.2640+00	6.3000+02	1.7412+03	1.7285+03	1.7405+03	1.7402+03
9	5.2640+00	9.3000+02	1.7691+03	1.7488+03	1.7687+03	1.7684+03
10	5.2640+00	1.1000+03	1.7612+03	1.7423+03	1.7603+03	1.7604+03
11	5.2640+00	1.8000+03	1.8418+03	1.7983+03	1.8424+03	1.8418+03
12	5.2640+00	1.9300+03	1.8465+03	1.8010+03	1.8461+03	1.8457+03
13	5.2640+00	2.1300+03	1.8476+03	1.8018+03	1.8474+03	1.8468+03
14	5.2640+00	2.2300+03	1.8415+03	1.7974+03	1.8414+03	1.8413+03
15	5.2640+00	2.3000+03	1.8412+03	1.7965+03	1.8411+03	1.8407+03
16	5.2640+00	2.3450+03	1.8450+03	1.8032+03	1.8449+03	1.8445+03
17	5.2740+00	5.0000+00	1.8403+03	1.8033+03	1.8399+03	1.8395+03
18	5.2740+00	2.0000+01	1.8411+03	1.8059+03	1.8413+03	1.8407+03
19	5.2740+00	2.5000+01	1.8425+03	1.8087+03	1.8425+03	1.8424+03
20	5.2740+00	1.3000+02	1.7165+03	1.6786+03	1.7165+03	1.7161+03
21	5.2740+00	7.4500+02	1.7235+03	1.7092+03	1.7232+03	1.7230+03
22	5.2740+00	9.0000+02	1.7246+03	1.7098+03	1.7240+03	1.7233+03
23	5.2740+00	1.1300+03	1.7600+03	1.7376+03	1.7594+03	1.7591+03
24	5.2740+00	1.4000+03	1.7941+03	1.7643+03	1.7929+03	1.7931+03
25	5.2740+00	1.5000+03	1.7993+03	1.7665+03	1.7987+03	1.7988+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	864	800	801	802	804	805
	POT-I	BW 91	BW 91	BW 91	BW 91	BW91-A
1	1.6086+03	1.6107+03	1.6096+03	1.6093+03	1.6099+03	1.6099+03
2	1.5834+03	1.5843+03	1.5831+03	1.5826+03	1.5836+03	1.5834+03
3	1.5751+03	1.5762+03	1.5748+03	1.5748+03	1.5754+03	1.5753+03
4	1.5629+03	1.5638+03	1.5633+03	1.5618+03	1.5634+03	1.5631+03
5	1.5495+03	1.5503+03	1.5492+03	1.5486+03	1.5496+03	1.5494+03
6	1.6671+03	1.6720+03	1.6705+03	1.6693+03	1.6707+03	1.6706+03
7	1.7120+03	1.7179+03	1.7167+03	1.7155+03	1.7162+03	1.7166+03
8	1.7296+03	1.7330+03	1.7312+03	1.7312+03	1.7306+03	1.7315+03
9	1.7495+03	1.7561+03	1.7533+03	1.7534+03	1.7525+03	1.7538+03
10	1.7393+03	1.7453+03	1.7438+03	1.7435+03	1.7431+03	1.7440+03
11	1.7989+03	1.8103+03	1.8076+03	1.8081+03	1.8048+03	1.8077+03
12	1.8022+03	1.8130+03	1.8115+03	1.8119+03	1.8091+03	1.8114+03
13	1.8028+03	1.8160+03	1.8127+03	1.8141+03	1.8096+03	1.8131+03
14	1.7981+03	1.8117+03	1.8084+03	1.8098+03	1.8057+03	1.8089+03
15	1.7977+03	1.8115+03	1.8071+03	1.8082+03	1.8048+03	1.8079+03
16	1.8043+03	1.8223+03	1.8176+03	1.8193+03	1.8149+03	1.8185+03
17	1.8041+03	1.8246+03	1.8238+03	1.8197+03	1.8244+03	1.8231+03
18	1.8069+03	1.8366+03	1.8350+03	1.8302+03	1.8329+03	1.8337+03
19	1.8099+03	1.8392+03	1.8378+03	1.8354+03	1.8364+03	1.8372+03
20	1.6799+03	1.6881+03	1.6864+03	1.6842+03	1.6858+03	1.6861+03
21	1.7107+03	1.7146+03	1.7125+03	1.7132+03	1.7119+03	1.7130+03
22	1.7112+03	1.7149+03	1.7136+03	1.7139+03	1.7126+03	1.7137+03
23	1.7387+03	1.7458+03	1.7438+03	1.7440+03	1.7423+03	1.7440+03
24	1.7655+03	1.7743+03	1.7716+03	1.7726+03	1.7705+03	1.7723+03
25	1.7677+03	1.7778+03	1.7750+03	1.7756+03	1.7728+03	1.7753+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	806	807	808	809	810	811
	BW 84	BW 84	BW 84	BW 84	BW84-A	BW 77
1	1.6126+03	1.6109+03	1.6118+03	1.6103+03	1.6114+03	1.6119+03
2	1.5849+03	1.5835+03	1.5857+03	1.5856+03	1.5849+03	1.5842+03
3	1.5779+03	1.5765+03	1.5777+03	1.5776+03	1.5774+03	1.5766+03
4	1.5648+03	1.5642+03	1.5662+03	1.5646+03	1.5650+03	1.5636+03
5	1.5519+03	1.5500+03	1.5524+03	1.5509+03	1.5513+03	1.5507+03
6	1.6738+03	1.6718+03	1.6725+03	1.6720+03	1.6725+03	1.6731+03
7	1.7199+03	1.7182+03	1.7189+03	1.7178+03	1.7187+03	1.7194+03
8	1.7342+03	1.7327+03	1.7344+03	1.7329+03	1.7336+03	1.7333+03
9	1.7578+03	1.7558+03	1.7568+03	1.7557+03	1.7565+03	1.7568+03
10	1.7473+03	1.7461+03	1.7476+03	1.7459+03	1.7467+03	1.7463+03
11	1.8126+03	1.8110+03	1.8105+03	1.8115+03	1.8114+03	1.8130+03
12	1.8165+03	1.8141+03	1.8138+03	1.8154+03	1.8150+03	1.8168+03
13	1.8178+03	1.8165+03	1.8165+03	1.8178+03	1.8172+03	1.8191+03
14	1.8133+03	1.8124+03	1.8122+03	1.8133+03	1.8128+03	1.8150+03
15	1.8120+03	1.8117+03	1.8119+03	1.8116+03	1.8118+03	1.8148+03
16	1.8238+03	1.8239+03	1.8231+03	1.8236+03	1.8236+03	1.8276+03
17	1.8304+03	1.8306+03	1.8274+03	1.8260+03	1.8286+03	1.8338+03
18	1.8401+03	1.8373+03	1.8385+03	1.8357+03	1.8379+03	1.8382+03
19	1.8418+03	1.8391+03	1.8408+03	1.8397+03	1.8404+03	1.8401+03
20	1.6906+03	1.6891+03	1.6894+03	1.6874+03	1.6891+03	1.6921+03
21	1.7170+03	1.7147+03	1.7169+03	1.7151+03	1.7159+03	1.7159+03
22	1.7170+03	1.7156+03	1.7171+03	1.7162+03	1.7165+03	1.7154+03
23	1.7476+03	1.7459+03	1.7474+03	1.7461+03	1.7468+03	1.7466+03
24	1.7762+03	1.7748+03	1.7756+03	1.7761+03	1.7757+03	1.7755+03
25	1.7796+03	1.7776+03	1.7792+03	1.7784+03	1.7787+03	1.7786+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	812	813	814	815	816	817
	BW 77	BW 77	BW 77	BW77-A	BW 70	BW 70
1	1.6118+03	1.6096+03	1.6112+03	1.6111+03	1.6109+03	1.6126+03
2	1.5850+03	1.5829+03	1.5850+03	1.5843+03	1.5836+03	1.5837+03
3	1.5772+03	1.5754+03	1.5774+03	1.5766+03	1.5757+03	1.5766+03
4	1.5654+03	1.5621+03	1.5641+03	1.5638+03	1.5625+03	1.5632+03
5	1.5514+03	1.5497+03	1.5501+03	1.5505+03	1.5487+03	1.5492+03
6	1.6739+03	1.6702+03	1.6731+03	1.6726+03	1.6719+03	1.6738+03
7	1.7206+03	1.7164+03	1.7193+03	1.7189+03	1.7182+03	1.7199+03
8	1.7348+03	1.7325+03	1.7330+03	1.7334+03	1.7326+03	1.7327+03
9	1.7583+03	1.7553+03	1.7560+03	1.7566+03	1.7562+03	1.7575+03
10	1.7490+03	1.7445+03	1.7466+03	1.7466+03	1.7460+03	1.7468+03
11	1.8155+03	1.8098+03	1.8125+03	1.8127+03	1.8146+03	1.8156+03
12	1.8193+03	1.8130+03	1.8152+03	1.8160+03	1.8182+03	1.8195+03
13	1.8215+03	1.8157+03	1.8182+03	1.8186+03	1.8210+03	1.8220+03
14	1.8180+03	1.8119+03	1.8139+03	1.8147+03	1.8167+03	1.8180+03
15	1.8176+03	1.8111+03	1.8141+03	1.8144+03	1.8156+03	1.8179+03
16	1.8310+03	1.8234+03	1.8258+03	1.8270+03	1.8298+03	1.8311+03
17	1.8353+03	1.8282+03	1.8296+03	1.8317+03	1.8341+03	1.8356+03
18	1.8408+03	1.8357+03	1.8381+03	1.8382+03	1.8377+03	1.8384+03
19	1.8417+03	1.8384+03	1.8398+03	1.8400+03	1.8401+03	1.8404+03
20	1.6911+03	1.6875+03	1.6890+03	1.6899+03	1.6904+03	1.6927+03
21	1.7169+03	1.7133+03	1.7152+03	1.7153+03	1.7142+03	1.7150+03
22	1.7170+03	1.7140+03	1.7159+03	1.7156+03	1.7150+03	1.7156+03
23	1.7484+03	1.7449+03	1.7462+03	1.7465+03	1.7463+03	1.7470+03
24	1.7781+03	1.7737+03	1.7757+03	1.7757+03	1.7756+03	1.7765+03
25	1.7821+03	1.7763+03	1.7788+03	1.7790+03	1.7787+03	1.7795+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	818	819	820	821	822	823
	BW 70	BW 70	BW70-A	BW 63	BW 63	BW 63
1	1.6099+03	1.6136+03	1.6118+03	1.6105+03	1.6111+03	1.6132+03
2	1.5826+03	1.5857+03	1.5839+03	1.5827+03	1.5829+03	1.5862+03
3	1.5744+03	1.5796+03	1.5766+03	1.5747+03	1.5762+03	1.5777+03
4	1.5630+03	1.5661+03	1.5637+03	1.5620+03	1.5628+03	1.5648+03
5	1.5489+03	1.5521+03	1.5497+03	1.5493+03	1.5488+03	1.5513+03
6	1.6722+03	1.6769+03	1.6737+03	1.6715+03	1.6740+03	1.6748+03
7	1.7185+03	1.7229+03	1.7199+03	1.7173+03	1.7202+03	1.7208+03
8	1.7318+03	1.7358+03	1.7332+03	1.7307+03	1.7321+03	1.7353+03
9	1.7548+03	1.7591+03	1.7569+03	1.7539+03	1.7567+03	1.7586+03
10	1.7462+03	1.7502+03	1.7473+03	1.7439+03	1.7470+03	1.7485+03
11	1.8132+03	1.8185+03	1.8155+03	1.8125+03	1.8161+03	1.8183+03
12	1.8164+03	1.8229+03	1.8192+03	1.8163+03	1.8205+03	1.8227+03
13	1.8202+03	1.8244+03	1.8219+03	1.8198+03	1.8227+03	1.8243+03
14	1.8162+03	1.8207+03	1.8179+03	1.8165+03	1.8190+03	1.8212+03
15	1.8166+03	1.8205+03	1.8176+03	1.8171+03	1.8195+03	1.8214+03
16	1.8302+03	1.8331+03	1.8310+03	1.8306+03	1.8335+03	1.8365+03
17	1.8328+03	1.8375+03	1.8350+03	1.8313+03	1.8337+03	1.8358+03
18	1.8370+03	1.8415+03	1.8387+03	1.8338+03	1.8374+03	1.8394+03
19	1.8379+03	1.8425+03	1.8402+03	1.8363+03	1.8384+03	1.8418+03
20	1.6908+03	1.6954+03	1.6923+03	1.6902+03	1.6940+03	1.6944+03
21	1.7145+03	1.7188+03	1.7156+03	1.7123+03	1.7143+03	1.7171+03
22	1.7134+03	1.7196+03	1.7159+03	1.7129+03	1.7142+03	1.7179+03
23	1.7450+03	1.7497+03	1.7470+03	1.7444+03	1.7456+03	1.7499+03
24	1.7742+03	1.7799+03	1.7766+03	1.7737+03	1.7761+03	1.7800+03
25	1.7794+03	1.7837+03	1.7803+03	1.7775+03	1.7804+03	1.7834+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	824	825	826	827	828	829
	BW63-A	BW 58	BW 58	BW 58	BW 58	BW 58
1	1.6116+03	1.6107+03	1.6104+03	1.6112+03	1.6120+03	1.6118+03
2	1.5839+03	1.5830+03	1.5830+03	1.5828+03	1.5827+03	1.5834+03
3	1.5762+03	1.5753+03	1.5748+03	1.5747+03	1.5753+03	1.5750+03
4	1.5632+03	1.5628+03	1.5629+03	1.5627+03	1.5635+03	1.5622+03
5	1.5498+03	1.5488+03	1.5489+03	1.5503+03	1.5491+03	1.5492+03
6	1.6734+03	1.6733+03	1.6735+03	1.6750+03	1.6760+03	1.6739+03
7	1.7194+03	1.7195+03	1.7190+03	1.7220+03	1.7218+03	1.7199+03
8	1.7327+03	1.7326+03	1.7319+03	1.7325+03	1.7328+03	1.7313+03
9	1.7564+03	1.7575+03	1.7560+03	1.7578+03	1.7576+03	1.7557+03
10	1.7465+03	1.7474+03	1.7472+03	1.7482+03	1.7489+03	1.7458+03
11	1.8156+03	1.8173+03	1.8162+03	1.8205+03	1.8202+03	1.8166+03
12	1.8198+03	1.8211+03	1.8204+03	1.8249+03	1.8248+03	1.8204+03
13	1.8222+03	1.8237+03	1.8228+03	1.8273+03	1.8268+03	1.8230+03
14	1.8189+03	1.8214+03	1.8202+03	1.8239+03	1.8233+03	1.8195+03
15	1.8193+03	1.8212+03	1.8196+03	1.8243+03	1.8235+03	1.8195+03
16	1.8335+03	1.8370+03	1.8354+03	1.8366+03	1.8379+03	1.8331+03
17	1.8336+03	1.8343+03	1.8340+03	1.8364+03	1.8346+03	1.8328+03
18	1.8369+03	1.8373+03	1.8364+03	1.8382+03	1.8370+03	1.8345+03
19	1.8388+03	1.8385+03	1.8383+03	1.8404+03	1.8388+03	1.8362+03
20	1.6929+03	1.6937+03	1.6926+03	1.6955+03	1.6973+03	1.6939+03
21	1.7146+03	1.7151+03	1.7138+03	1.7153+03	1.7145+03	1.7127+03
22	1.7150+03	1.7148+03	1.7144+03	1.7156+03	1.7150+03	1.7135+03
23	1.7466+03	1.7465+03	1.7456+03	1.7480+03	1.7474+03	1.7455+03
24	1.7766+03	1.7772+03	1.7764+03	1.7789+03	1.7788+03	1.7754+03
25	1.7804+03	1.7821+03	1.7797+03	1.7826+03	1.7824+03	1.7798+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	830	831	832	833	834	835
	BW 58	BW58-A	BW 50	BW 50	BW 50	BW 50
1	1.6153+03	1.6119+03	1.6124+03	1.6135+03	1.6121+03	1.6137+03
2	1.5869+03	1.5836+03	1.5832+03	1.5848+03	1.5838+03	1.5853+03
3	1.5785+03	1.5756+03	1.5757+03	1.5765+03	1.5764+03	1.5771+03
4	1.5658+03	1.5633+03	1.5632+03	1.5635+03	1.5633+03	1.5640+03
5	1.5524+03	1.5498+03	1.5494+03	1.5510+03	1.5497+03	1.5508+03
6	1.6773+03	1.6748+03	1.6750+03	1.6759+03	1.6741+03	1.6760+03
7	1.7237+03	1.7210+03	1.7214+03	1.7231+03	1.7199+03	1.7223+03
8	1.7365+03	1.7329+03	1.7332+03	1.7330+03	1.7326+03	1.7335+03
9	1.7606+03	1.7575+03	1.7582+03	1.7586+03	1.7569+03	1.7590+03
10	1.7512+03	1.7481+03	1.7479+03	1.7490+03	1.7474+03	1.7491+03
11	1.8213+03	1.8187+03	1.8196+03	1.8234+03	1.8182+03	1.8221+03
12	1.8255+03	1.8229+03	1.8236+03	1.8280+03	1.8228+03	1.8254+03
13	1.8279+03	1.8252+03	1.8257+03	1.8302+03	1.8245+03	1.8273+03
14	1.8249+03	1.8222+03	1.8237+03	1.8257+03	1.8228+03	1.8245+03
15	1.8247+03	1.8221+03	1.8237+03	1.8255+03	1.8216+03	1.8263+03
16	1.8405+03	1.8368+03	1.8394+03	1.8391+03	1.8385+03	1.8397+03
17	1.8389+03	1.8352+03	1.8343+03	1.8340+03	1.8334+03	1.8336+03
18	1.8406+03	1.8373+03	1.8369+03	1.8365+03	1.8366+03	1.8368+03
19	1.8428+03	1.8392+03	1.8384+03	1.8386+03	1.8380+03	1.8389+03
20	1.6968+03	1.6949+03	1.6958+03	1.6990+03	1.6952+03	1.6969+03
21	1.7184+03	1.7150+03	1.7152+03	1.7157+03	1.7148+03	1.7158+03
22	1.7187+03	1.7154+03	1.7149+03	1.7161+03	1.7150+03	1.7164+03
23	1.7508+03	1.7473+03	1.7471+03	1.7490+03	1.7468+03	1.7489+03
24	1.7819+03	1.7781+03	1.7781+03	1.7807+03	1.7777+03	1.7799+03
25	1.7861+03	1.7821+03	1.7820+03	1.7845+03	1.7818+03	1.7846+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	836	837	838	839	840	841
	BW 50	BW50-A	BW 43	BW 43	BW 43	BW 43
1	1.6142+03	1.6132+03	1.6130+03	1.6143+03	1.6144+03	1.6148+03
2	1.5856+03	1.5845+03	1.5840+03	1.5841+03	1.5858+03	1.5848+03
3	1.5770+03	1.5765+03	1.5760+03	1.5764+03	1.5774+03	1.5771+03
4	1.5646+03	1.5637+03	1.5629+03	1.5633+03	1.5649+03	1.5638+03
5	1.5513+03	1.5504+03	1.5495+03	1.5502+03	1.5511+03	1.5506+03
6	1.6775+03	1.6757+03	1.6751+03	1.6777+03	1.6774+03	1.6779+03
7	1.7241+03	1.7221+03	1.7215+03	1.7242+03	1.7235+03	1.7249+03
8	1.7343+03	1.7333+03	1.7325+03	1.7329+03	1.7348+03	1.7339+03
9	1.7599+03	1.7585+03	1.7578+03	1.7593+03	1.7601+03	1.7600+03
10	1.7504+03	1.7487+03	1.7477+03	1.7498+03	1.7506+03	1.7504+03
11	1.8237+03	1.8214+03	1.8208+03	1.8250+03	1.8238+03	1.8256+03
12	1.8278+03	1.8255+03	1.8246+03	1.8299+03	1.8279+03	1.8301+03
13	1.8297+03	1.8275+03	1.8264+03	1.8319+03	1.8298+03	1.8319+03
14	1.8267+03	1.8247+03	1.8236+03	1.8283+03	1.8285+03	1.8285+03
15	1.8268+03	1.8248+03	1.8246+03	1.8283+03	1.8273+03	1.8285+03
16	1.8406+03	1.8395+03	1.8394+03	1.8396+03	1.8423+03	1.8404+03
17	1.8350+03	1.8340+03	1.8328+03	1.8330+03	1.8357+03	1.8339+03
18	1.8379+03	1.8369+03	1.8360+03	1.8356+03	1.8385+03	1.8368+03
19	1.8399+03	1.8388+03	1.8378+03	1.8375+03	1.8403+03	1.8387+03
20	1.6995+03	1.6973+03	1.6961+03	1.7006+03	1.6997+03	1.7009+03
21	1.7164+03	1.7156+03	1.7142+03	1.7151+03	1.7168+03	1.7161+03
22	1.7171+03	1.7159+03	1.7148+03	1.7155+03	1.7173+03	1.7165+03
23	1.7497+03	1.7483+03	1.7472+03	1.7491+03	1.7498+03	1.7499+03
24	1.7812+03	1.7795+03	1.7787+03	1.7809+03	1.7814+03	1.7817+03
25	1.7856+03	1.7837+03	1.7838+03	1.7855+03	1.7857+03	1.7863+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	842	843	844	845	846	847
	BW43-A	BW 36	BW 36	BW 36	BW 36	BW36-A
1	1.6141+03	1.6142+03	1.6144+03	1.6164+03	1.6164+03	1.6154+03
2	1.5847+03	1.5849+03	1.5845+03	1.5861+03	1.5861+03	1.5854+03
3	1.5767+03	1.5763+03	1.5763+03	1.5777+03	1.5790+03	1.5773+03
4	1.5637+03	1.5636+03	1.5632+03	1.5646+03	1.5657+03	1.5643+03
5	1.5504+03	1.5499+03	1.5500+03	1.5511+03	1.5521+03	1.5508+03
6	1.6770+03	1.6777+03	1.6782+03	1.6798+03	1.6804+03	1.6790+03
7	1.7235+03	1.7240+03	1.7248+03	1.7264+03	1.7269+03	1.7255+03
8	1.7335+03	1.7335+03	1.7329+03	1.7344+03	1.7366+03	1.7344+03
9	1.7593+03	1.7600+03	1.7599+03	1.7617+03	1.7630+03	1.7612+03
10	1.7496+03	1.7504+03	1.7505+03	1.7523+03	1.7531+03	1.7516+03
11	1.8238+03	1.8269+03	1.8269+03	1.8299+03	1.8288+03	1.8281+03
12	1.8281+03	1.8303+03	1.8319+03	1.8337+03	1.8329+03	1.8322+03
13	1.8300+03	1.8314+03	1.8338+03	1.8356+03	1.8358+03	1.8342+03
14	1.8272+03	1.8288+03	1.8302+03	1.8320+03	1.8329+03	1.8310+03
15	1.8272+03	1.8296+03	1.8301+03	1.8327+03	1.8328+03	1.8313+03
16	1.8404+03	1.8404+03	1.8395+03	1.8413+03	1.8444+03	1.8414+03
17	1.8339+03	1.8333+03	1.8331+03	1.8340+03	1.8379+03	1.8346+03
18	1.8367+03	1.8359+03	1.8360+03	1.8371+03	1.8405+03	1.8374+03
19	1.8386+03	1.8379+03	1.8375+03	1.8386+03	1.8424+03	1.8391+03
20	1.6994+03	1.7011+03	1.7021+03	1.7043+03	1.7037+03	1.7028+03
21	1.7155+03	1.7153+03	1.7158+03	1.7171+03	1.7192+03	1.7168+03
22	1.7160+03	1.7163+03	1.7157+03	1.7174+03	1.7194+03	1.7172+03
23	1.7490+03	1.7494+03	1.7500+03	1.7518+03	1.7535+03	1.7512+03
24	1.7807+03	1.7823+03	1.7823+03	1.7843+03	1.7854+03	1.7836+03
25	1.7853+03	1.7873+03	1.7873+03	1.7900+03	1.7902+03	1.7887+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	848	849	850	851	852	853
	BW 29	BW 29	BW 29	BW29-A	BW 23	BW 23
1	1.6176+03	1.6179+03	1.6173+03	1.6176+03	1.6187+03	1.6172+03
2	1.5868+03	1.5867+03	1.5876+03	1.5870+03	1.5879+03	1.5864+03
3	1.5784+03	1.5794+03	1.5793+03	1.5790+03	1.5790+03	1.5786+03
4	1.5658+03	1.5659+03	1.5662+03	1.5660+03	1.5660+03	1.5658+03
5	1.5522+03	1.5523+03	1.5526+03	1.5524+03	1.5526+03	1.5526+03
6	1.6815+03	1.6818+03	1.6814+03	1.6816+03	1.6837+03	1.6806+03
7	1.7283+03	1.7284+03	1.7280+03	1.7282+03	1.7305+03	1.7262+03
8	1.7358+03	1.7361+03	1.7376+03	1.7365+03	1.7370+03	1.7337+03
9	1.7636+03	1.7638+03	1.7641+03	1.7639+03	1.7651+03	1.7602+03
10	1.7545+03	1.7541+03	1.7546+03	1.7544+03	1.7565+03	1.7514+03
11	1.8334+03	1.8324+03	1.8305+03	1.8321+03	1.8370+03	1.8278+03
12	1.8370+03	1.8370+03	1.8349+03	1.8363+03	1.8408+03	1.8325+03
13	1.8389+03	1.8394+03	1.8375+03	1.8386+03	1.8423+03	1.8347+03
14	1.8347+03	1.8351+03	1.8346+03	1.8348+03	1.8376+03	1.8307+03
15	1.8354+03	1.8353+03	1.8346+03	1.8351+03	1.8375+03	1.8310+03
16	1.8426+03	1.8430+03	1.8453+03	1.8436+03	1.8432+03	1.8389+03
17	1.8355+03	1.8359+03	1.8388+03	1.8367+03	1.8365+03	1.8331+03
18	1.8379+03	1.8391+03	1.8414+03	1.8395+03	1.8390+03	1.8348+03
19	1.8399+03	1.8405+03	1.8429+03	1.8411+03	1.8408+03	1.8363+03
20	1.7064+03	1.7067+03	1.7050+03	1.7060+03	1.7090+03	1.7039+03
21	1.7186+03	1.7189+03	1.7203+03	1.7193+03	1.7198+03	1.7160+03
22	1.7191+03	1.7192+03	1.7207+03	1.7197+03	1.7199+03	1.7169+03
23	1.7535+03	1.7542+03	1.7545+03	1.7541+03	1.7555+03	1.7512+03
24	1.7869+03	1.7868+03	1.7872+03	1.7870+03	1.7894+03	1.7834+03
25	1.7927+03	1.7923+03	1.7920+03	1.7923+03	1.7948+03	1.7884+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	855	856	857	858	859	866
	BW 23	BW 23	BW 23	BW 23	BW-23A	SIT-I
1	1.6172+03	1.6196+03	1.6173+03	1.6197+03	1.6183+03	1.3518+03
2	1.5867+03	1.5872+03	1.5866+03	1.5885+03	1.5872+03	1.3727+03
3	1.5783+03	1.5792+03	1.5783+03	1.5812+03	1.5791+03	1.3761+03
4	1.5652+03	1.5666+03	1.5652+03	1.5677+03	1.5661+03	1.3210+03
5	1.5515+03	1.5527+03	1.5515+03	1.5543+03	1.5525+03	1.2055+03
6	1.6813+03	1.6841+03	1.6814+03	1.6847+03	1.6826+03	1.4122+03
7	1.7277+03	1.7307+03	1.7283+03	1.7314+03	1.7291+03	1.4506+03
8	1.7358+03	1.7371+03	1.7362+03	1.7390+03	1.7365+03	1.5003+03
9	1.7631+03	1.7648+03	1.7636+03	1.7669+03	1.7640+03	1.5018+03
10	1.7538+03	1.7565+03	1.7546+03	1.7571+03	1.7550+03	1.4881+03
11	1.8323+03	1.8365+03	1.8336+03	1.8358+03	1.8338+03	1.4957+03
12	1.8362+03	1.8408+03	1.8370+03	1.8402+03	1.8379+03	1.4582+03
13	1.8386+03	1.8422+03	1.8394+03	1.8431+03	1.8401+03	1.4311+03
14	1.8344+03	1.8377+03	1.8357+03	1.8388+03	1.8358+03	1.4078+03
15	1.8347+03	1.8372+03	1.8352+03	1.8387+03	1.8357+03	1.4002+03
16	1.8429+03	1.8430+03	1.8431+03	1.8461+03	1.8428+03	1.3877+03
17	1.8367+03	1.8367+03	1.8366+03	1.8391+03	1.8365+03	1.3524+03
18	1.8387+03	1.8387+03	1.8391+03	1.8419+03	1.8387+03	1.3231+03
19	1.8404+03	1.8408+03	1.8404+03	1.8436+03	1.8404+03	1.3006+03
20	1.7057+03	1.7093+03	1.7065+03	1.7097+03	1.7074+03	1.1952+03
21	1.7185+03	1.7191+03	1.7185+03	1.7220+03	1.7190+03	1.3854+03
22	1.7191+03	1.7200+03	1.7192+03	1.7225+03	1.7196+03	1.3805+03
23	1.7533+03	1.7553+03	1.7539+03	1.7574+03	1.7544+03	1.3665+03
24	1.7865+03	1.7893+03	1.7870+03	1.7909+03	1.7877+03	1.3550+03
25	1.7918+03	1.7946+03	1.7165+03	1.7957+03	1.7803+03	1.3421+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	867	868	869	870	871	872
	SIT-I	SOT-I	SOT-I	BI 13	BI 21	BI 35
1	1.3516+03	1.5617+03	1.5617+03	1.5624+03	1.5695+03	1.5747+03
2	1.3719+03	1.5572+03	1.5578+03	1.5569+03	1.5591+03	1.5609+03
3	1.3756+03	1.5520+03	1.5530+03	1.5523+03	1.5541+03	1.5558+03
4	1.3214+03	1.5429+03	1.5434+03	1.5434+03	1.5447+03	1.5452+03
5	1.2048+03	1.5326+03	1.5336+03	1.5334+03	1.5343+03	1.5347+03
6	1.4115+03	1.6096+03	1.6111+03	1.6123+03	1.6193+03	1.6258+03
7	1.4503+03	1.6553+03	1.6567+03	1.6570+03	1.6627+03	1.6688+03
8	1.5001+03	1.7062+03	1.7064+03	1.7057+03	1.7057+03	1.7057+03
9	1.5013+03	1.7057+03	1.7066+03	1.7063+03	1.7090+03	1.7118+03
10	1.4881+03	1.6913+03	1.6914+03	1.6917+03	1.6949+03	1.6990+03
11	1.4957+03	1.6911+03	1.6924+03	1.6910+03	1.7052+03	1.7207+03
12	1.4574+03	1.6982+03	1.6992+03	1.6984+03	1.7090+03	1.7218+03
13	1.4302+03	1.6986+03	1.6999+03	1.6995+03	1.7083+03	1.7211+03
14	1.4080+03	1.6905+03	1.6911+03	1.6899+03	1.6971+03	1.7110+03
15	1.3993+03	1.6889+03	1.6901+03	1.6889+03	1.6965+03	1.7085+03
16	1.3872+03	1.7042+03	1.7056+03	1.6710+03	1.6771+03	1.6837+03
17	1.3523+03	1.6991+03	1.7007+03	1.6541+03	1.6347+03	1.6233+03
18	1.3238+03	1.6838+03	1.6852+03	1.7623+03	1.6095+03	1.5827+03
19	1.3014+03	1.6760+03	1.6772+03	1.7626+03	1.5995+03	1.5606+03
20	1.1931+03	1.5763+03	1.5773+03	1.5757+03	1.5983+03	1.6130+03
21	1.3835+03	1.6867+03	1.6876+03	1.6861+03	1.6865+03	1.6870+03
22	1.3786+03	1.6877+03	1.6887+03	1.6879+03	1.6888+03	1.6892+03
23	1.3654+03	1.6999+03	1.7007+03	1.7005+03	1.7019+03	1.7051+03
24	1.3550+03	1.7135+03	1.7138+03	1.7131+03	1.7159+03	1.7204+03
25	1.3416+03	1.7076+03	1.7080+03	1.7078+03	1.7106+03	1.7160+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	873	874	875	876	211	213
	BI 49	BI 63	BI 77	BI 91	BB	BB
1	1.5782+03	1.5799+03	1.5786+03	1.5638+03	1.3691+03	1.3603+03
2	1.5635+03	1.5644+03	1.5635+03	1.5416+03	1.3894+03	1.3815+03
3	1.5580+03	1.5589+03	1.5589+03	1.5332+03	1.3919+03	1.3840+03
4	1.5473+03	1.5487+03	1.5473+03	1.5303+03	1.3404+03	1.3307+03
5	1.5361+03	1.5361+03	1.5352+03	1.5299+03	1.2316+03	1.2173+03
6	1.6299+03	1.6258+03	1.6295+03	1.6197+03	1.4298+03	1.4197+03
7	1.6719+03	1.6723+03	1.6706+03	1.6662+03	1.4686+03	1.4584+03
8	1.7071+03	1.6969+03	1.7048+03	1.6859+03	1.5174+03	1.5081+03
9	1.7132+03	1.7136+03	1.7118+03	1.7007+03	1.5192+03	1.5100+03
10	1.7009+03	1.7018+03	1.6995+03	1.6909+03	1.5057+03	1.4965+03
11	1.7285+03	1.7321+03	1.7307+03	1.7330+03	1.5155+03	1.5041+03
12	1.7313+03	1.7350+03	1.7327+03	1.7355+03	1.4800+03	1.4672+03
13	1.7288+03	1.7315+03	1.7311+03	1.7338+03	1.4547+03	1.4402+03
14	1.7174+03	1.7214+03	1.7210+03	1.7228+03	1.4361+03	1.4199+03
15	1.7172+03	1.7218+03	1.7195+03	1.7236+03	1.4272+03	1.4103+03
16	1.6938+03	1.7039+03	1.7039+03	1.7080+03	1.4206+03	1.4027+03
17	1.6328+03	1.6558+03	1.6558+03	1.6585+03	1.3957+03	1.3747+03
18	1.5951+03	1.6217+03	1.6217+03	1.6244+03	1.3722+03	1.3499+03
19	1.5742+03	1.5794+03	1.5862+03	1.6054+03	1.3561+03	1.3312+03
20	1.6222+03	1.6266+03	1.6257+03	1.6280+03	1.2159+03	1.1973+03
21	1.6856+03	1.6878+03	1.6852+03	1.6800+03	1.4079+03	1.3949+03
22	1.6892+03	1.6897+03	1.6875+03	1.6818+03	1.4042+03	1.3902+03
23	1.7065+03	1.7065+03	1.7037+03	1.7074+03	1.3924+03	1.3766+03
24	1.7222+03	1.7236+03	1.7209+03	1.7227+03	1.3825+03	1.3648+03
25	1.7192+03	1.7183+03	1.7179+03	1.7197+03	1.3716+03	1.3540+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	215	222	225	228	230	233
	BB	PIT-A	POT-A	SIT-A	SOT-A	PFMST
1	1.3595+03	1.6257+03	1.6081+03	1.3517+03	1.5617+03	1.6044+03
2	1.3806+03	1.5937+03	1.5826+03	1.3723+03	1.5575+03	1.5785+03
3	1.3831+03	1.5849+03	1.5746+03	1.3758+03	1.5525+03	1.5705+03
4	1.3298+03	1.5723+03	1.5624+03	1.3212+03	1.5431+03	1.5584+03
5	1.2148+03	1.5588+03	1.5490+03	1.2051+03	1.5331+03	1.5443+03
6	1.4188+03	1.6892+03	1.6666+03	1.4119+03	1.6104+03	1.6646+03
7	1.4576+03	1.7355+03	1.7115+03	1.4504+03	1.6560+03	1.7089+03
8	1.5072+03	1.7406+03	1.7291+03	1.5002+03	1.7063+03	1.7254+03
9	1.5091+03	1.7687+03	1.7491+03	1.5015+03	1.7061+03	1.7466+03
10	1.4960+03	1.7606+03	1.7408+03	1.4881+03	1.6914+03	1.7362+03
11	1.5028+03	1.8420+03	1.7986+03	1.4957+03	1.6918+03	1.7942+03
12	1.4659+03	1.8461+03	1.8016+03	1.4578+03	1.6987+03	1.7982+03
13	1.4384+03	1.8473+03	1.8023+03	1.4306+03	1.6993+03	1.7994+03
14	1.4172+03	1.8414+03	1.7978+03	1.4079+03	1.6908+03	1.7936+03
15	1.4090+03	1.8410+03	1.7971+03	1.3997+03	1.6895+03	1.7934+03
16	1.3998+03	1.8448+03	1.8037+03	1.3875+03	1.7049+03	1.8001+03
17	1.3704+03	1.8399+03	1.8037+03	1.3524+03	1.6999+03	1.7974+03
18	1.3446+03	1.8410+03	1.8064+03	1.3234+03	1.6845+03	1.8029+03
19	1.3257+03	1.8425+03	1.8093+03	1.3010+03	1.6766+03	1.8056+03
20	1.1946+03	1.7164+03	1.6793+03	1.1942+03	1.5768+03	1.6746+03
21	1.3932+03	1.7232+03	1.7099+03	1.3845+03	1.6871+03	1.7054+03
22	1.3880+03	1.7240+03	1.7105+03	1.3796+03	1.6882+03	1.7073+03
23	1.3748+03	1.7595+03	1.7382+03	1.3660+03	1.7003+03	1.7354+03
24	1.3631+03	1.7934+03	1.7649+03	1.3550+03	1.7136+03	1.7618+03
25	1.3511+03	1.7989+03	1.7671+03	1.3419+03	1.7078+03	1.7642+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	235	237	239	243	247	249
	PFMMT	SFMST	SFMMT	PFLO	SFLO	G-NA
1	1.9841+02	1.3518+03	1.2637+02	6.8865+00	1.6029-01	1.3890+07
2	2.0125+02	1.3727+03	1.3097+02	6.8786+00	1.6498-01	1.3874+07
3	2.0461+02	1.3761+03	1.3433+02	6.8587+00	1.7336-01	1.3834+07
4	2.0749+02	1.3210+03	1.3633+02	6.9590+00	1.3105-01	1.4036+07
5	2.1060+02	1.2055+03	1.3460+02	6.9570+00	8.0609-02	1.4032+07
6	2.2373+02	1.4122+03	1.4465+02	6.8642+00	1.6204-01	1.3845+07
7	2.2373+02	1.4506+03	1.4025+02	6.8610+00	1.6100-01	1.3839+07
8	2.1885+02	1.5003+03	1.3581+02	6.8411+00	1.5818-01	1.3798+07
9	2.2509+02	1.5018+03	1.4249+02	6.7639+00	1.6466-01	1.3643+07
10	2.3008+02	1.4881+03	1.4837+02	6.7937+00	1.6223-01	1.3703+07
11	2.4071+02	1.4957+03	1.5290+02	6.8601+00	1.5618-01	1.3837+07
12	2.3787+02	1.4582+03	1.4773+02	6.8762+00	1.3619-01	1.3869+07
13	2.3556+02	1.4311+03	1.4355+02	6.8605+00	1.1672-01	1.3838+07
14	2.3464+02	1.4078+03	1.4170+02	6.8771+00	1.0792-01	1.3871+07
15	2.3409+02	1.4002+03	1.4069+02	6.8700+00	1.0776-01	1.3857+07
16	2.3365+02	1.3877+03	1.3979+02	6.8657+00	9.1007-02	1.3848+07
17	2.3382+02	1.3524+03	1.3864+02	6.8579+00	7.9995-02	1.3832+07
18	2.3397+02	1.3231+03	1.3748+02	6.8150+00	6.9974-02	1.3746+07
19	2.3424+02	1.3006+03	1.3644+02	6.8350+00	6.3285-02	1.3786+07
20	2.2846+02	1.1952+03	1.3046+02	7.1207+00	1.1468-01	1.4362+07
21	2.2259+02	1.3854+03	1.3779+02	6.8556+00	9.7162-02	1.3828+07
22	2.2226+02	1.3805+03	1.3834+02	6.8884+00	8.8833-02	1.3894+07
23	2.2710+02	1.3665+03	1.3966+02	6.7923+00	9.2786-02	1.3700+07
24	2.3370+02	1.3550+03	1.4379+02	6.6714+00	8.2368-02	1.3456+07
25	2.3636+02	1.3421+03	1.4439+02	6.8077+00	8.6328-02	1.3731+07

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	251	255	258	270	271	272
	G-K	BOP	VPKC	BIP	DPB-G	TSATKI
1	1.4284+05	3.1691+01	3.2510+01	3.6196+01	4.5048+00	1.5869+03
2	1.4701+05	3.1290+01	3.1922+01	3.4736+01	3.4460+00	1.5773+03
3	1.5448+05	3.0828+01	3.1219+01	3.3627+01	2.7992+00	1.5696+03
4	1.1677+05	2.9503+01	2.9976+01	3.2553+01	3.0495+00	1.5620+03
5	7.1830+04	2.7963+01	2.8679+01	3.0810+01	2.8471+00	1.5496+03
6	1.4440+05	3.9809+01	3.9902+01	4.5035+01	5.2253+00	1.6403+03
7	1.4347+05	4.7657+01	4.7927+01	5.2788+01	5.1318+00	1.6809+03
8	1.4096+05	5.7848+01	5.8114+01	6.0174+01	2.3257+00	1.7156+03
9	1.4672+05	4.7151+00	5.8079+01	6.1671+01	5.6956+01	1.7224+03
10	1.4456+05	5.4825+01	5.4939+01	5.9138+01	4.3125+00	1.7109+03
11	1.3917+05	5.5545+01	5.5021+01	6.6708+01	1.1163+01	1.7438+03
12	1.2136+05	5.6956+01	5.6453+01	6.7082+01	1.0126+01	1.7454+03
13	1.0401+05	5.6985+01	5.6568+01	6.5355+01	8.3698+00	1.7381+03
14	9.6163+04	5.4940+01	5.4825+01	6.4663+01	9.7229+00	1.7352+03
15	9.6022+04	5.4077+01	5.4562+01	6.3627+01	9.5503+00	1.7308+03
16	8.1096+04	5.0812+01	5.7813+01	6.1151+01	1.0339+01	1.7200+03
17	7.1283+04	3.8218+01	5.6700+01	4.9408+01	1.1190+01	1.6638+03
18	6.2353+04	3.0427+01	5.3529+01	4.4238+01	1.3811+01	1.6358+03
19	5.6393+04	2.5867+01	5.1903+01	4.0405+01	1.4538+01	1.6134+03
20	1.0219+05	3.5257+01	3.4656+01	4.4208+01	8.9509+00	1.6356+03
21	8.6580+04	5.3472+01	5.4070+01	5.5740+01	2.2678+00	1.6952+03
22	7.9159+04	5.3818+01	5.4283+01	5.6402+01	2.5843+00	1.6985+03
23	8.2680+04	5.6697+01	5.6787+01	6.0345+01	3.6484+00	1.7164+03
24	7.3397+04	5.9547+01	5.9734+01	6.3972+01	4.4247+00	1.7323+03
25	7.6926+04	5.8424+01	5.8451+01	6.3195+01	4.7703+00	1.7290+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	279	284	287	291	703	705
	QL	QPRI	DT-SC	QSC	QUAL-B	VFV-B
1	2.1284+00	3.4966+01	2.3523+02	7.5882+00	2.1872-01	5.5613-01
2	2.0367+00	2.1341+01	2.0505+02	6.8173+00	1.1436-01	3.0453-01
3	2.0108+00	1.9560+01	1.9380+02	6.7668+00	9.5865-02	2.7401-01
4	1.9730+00	1.9100+01	2.4080+02	6.3048+00	1.2554-01	2.8108-01
5	1.9325+00	1.8938+01	3.4442+02	5.4624+00	2.1035-01	3.0074-01
6	2.3277+00	4.5712+01	2.2841+02	7.5613+00	3.0432-01	6.4970-01
7	2.4825+00	4.8578+01	2.3050+02	7.6607+00	3.3107-01	5.9857-01
8	2.5176+00	2.2116+01	2.1539+02	7.1225+00	1.2562-01	1.8676-01
9	2.6052+00	3.8813+01	2.2085+02	7.6117+00	2.5045-01	3.8782-01
10	2.5762+00	3.9481+01	2.2284+02	7.5397+00	2.5965-01	4.1679-01
11	2.8376+00	9.0873+01	2.4814+02	8.1326+00	6.9855-01	1.0781+00
12	2.8513+00	9.3574+01	2.8758+02	8.1843+00	8.2453-01	1.0844+00
13	2.8549+00	9.4310+01	3.0746+02	7.4639+00	9.7404-01	1.0958+00
14	2.8350+00	9.1727+01	3.2726+02	7.3183+00	1.0219+00	1.0933+00
15	2.8330+00	9.2250+01	3.3107+02	7.3785+00	1.0276+00	1.1025+00
16	2.8514+00	8.5931+01	3.3255+02	6.2378+00	1.1400+00	9.7990-01
17	2.8404+00	7.5258+01	3.1140+02	5.0620+00	1.1261+00	8.6643-01
18	2.8469+00	7.1507+01	3.1237+02	4.4101+00	1.2216+00	8.6570-01
19	2.8545+00	6.8591+01	3.1239+02	3.9658+00	1.2944+00	8.5279-01
20	2.3994+00	7.9543+01	4.4145+02	1.0061+01	7.7119-01	1.3206+00
21	2.4551+00	2.5872+01	3.1079+02	6.1947+00	2.6332-01	2.5679-01
22	2.4574+00	2.6396+01	3.1889+02	5.8110+00	3.0167-01	2.6803-01
23	2.5700+00	4.2596+01	3.5043+02	6.6785+00	5.0578-01	4.5074-01
24	2.6807+00	5.6883+01	3.7730+02	6.3893+00	8.0278-01	6.0565-01
25	2.6960+00	6.5229+01	3.8711+02	6.8557+00	8.8385-01	7.1328-01

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	707	713	715	717	720	721
	VVEL-B	VCIT-I	VCIT-I	VCIT-A	VCOT-I	VCOT-I
1	1.3766+02	1.5590+03	1.5577+03	1.5584+03	1.5547+03	1.5577+03
2	7.5379+01	1.5549+03	1.5538+03	1.5543+03	1.5508+03	1.5546+03
3	6.7823+01	1.5495+03	1.5502+03	1.5498+03	1.5423+03	1.5495+03
4	6.9574+01	1.5400+03	1.5407+03	1.5404+03	1.5324+03	1.5399+03
5	7.4441+01	1.5309+03	1.5301+03	1.5305+03	1.5221+03	1.5309+03
6	1.6082+02	1.6070+03	1.6067+03	1.6068+03	1.5974+03	1.6055+03
7	1.4816+02	1.6534+03	1.6539+03	1.6536+03	1.6441+03	1.6520+03
8	4.6228+01	1.7036+03	1.7028+03	1.7032+03	1.6983+03	1.7034+03
9	9.5995+01	1.7030+03	1.7030+03	1.7030+03	1.6974+03	1.7018+03
10	1.0317+02	1.6886+03	1.6889+03	1.6888+03	1.6811+03	1.6878+03
11	2.6685+02	1.6884+03	1.6868+03	1.6876+03	1.6728+03	1.6843+03
12	2.6841+02	1.6961+03	1.6946+03	1.6954+03	1.6821+03	1.6924+03
13	2.7125+02	1.6966+03	1.6954+03	1.6960+03	1.6830+03	1.6935+03
14	2.7061+02	1.6872+03	1.6873+03	1.6872+03	1.6746+03	1.6851+03
15	2.7289+02	1.6864+03	1.6864+03	1.6864+03	1.6733+03	1.6840+03
16	2.4255+02	1.6674+03	1.6679+03	1.6676+03	1.6542+03	1.6640+03
17	2.1446+02	1.6170+03	1.6181+03	1.6176+03	1.5837+03	1.5943+03
18	2.1428+02	1.5841+03	1.5850+03	1.5845+03	1.5330+03	1.5417+03
19	2.1109+02	1.5657+03	1.5670+03	1.5664+03	1.5000+03	1.5105+03
20	3.2687+02	1.5717+03	1.5724+03	1.5721+03	1.5584+03	1.5680+03
21	6.3562+01	1.6840+03	1.6845+03	1.6842+03	1.6799+03	1.6845+03
22	6.6345+01	1.6851+03	1.6837+03	1.6844+03	1.6808+03	1.6845+03
23	1.1157+02	1.6969+03	1.6974+03	1.6971+03	1.6881+03	1.6966+03
24	1.4991+02	1.7108+03	1.7102+03	1.7105+03	1.6998+03	1.7105+03
25	1.7655+02	1.7044+03	1.7038+03	1.7041+03	1.6943+03	1.7031+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	722	724	727	730	732	733
	VCOT-I	VCOT-A	VP VCI	DPVC	HCOT-I	HCOT-I
1	1.5566+03	1.5563+03	3.2040+01	2.8429-01	1.5577+03	1.5561+03
2	1.5528+03	1.5527+03	3.1476+01	2.2666-01	1.5543+03	1.5531+03
3	1.5495+03	1.5471+03	3.0844+01	3.5159-01	1.5485+03	1.5475+03
4	1.5404+03	1.5375+03	2.9621+01	3.6582-01	1.5391+03	1.5389+03
5	1.5294+03	1.5275+03	2.8341+01	3.8765-01	1.5299+03	1.5294+03
6	1.6062+03	1.6030+03	3.9318+01	6.2405-01	1.6063+03	1.6042+03
7	1.6528+03	1.6496+03	4.7467+01	7.7177-01	1.6505+03	1.6495+03
8	1.7028+03	1.7015+03	5.7429+01	3.7162-01	1.7022+03	1.7004+03
9	1.7030+03	1.7007+03	5.7375+01	4.9550-01	1.7028+03	1.7006+03
10	1.6881+03	1.6857+03	5.4402+01	6.3391-01	1.6867+03	1.6856+03
11	1.6843+03	1.6805+03	5.4173+01	1.4781+00	1.6829+03	1.6775+03
12	1.6915+03	1.6887+03	5.5764+01	1.3834+00	1.6910+03	1.6865+03
13	1.6926+03	1.6897+03	5.5896+01	1.2967+00	1.6932+03	1.6884+03
14	1.6845+03	1.6814+03	5.4091+01	1.2096+00	1.6848+03	1.6810+03
15	1.6832+03	1.6802+03	5.3911+01	1.2812+00	1.6824+03	1.6792+03
16	1.6645+03	1.6609+03	5.0149+01	1.2877+00	1.6616+03	1.6606+03
17	1.5929+03	1.5903+03	4.1093+01	4.3790+00	1.5536+03	1.5528+03
18	1.5418+03	1.5388+03	3.5835+01	6.4113+00	1.4755+03	1.4755+03
19	1.5092+03	1.5065+03	3.3169+01	7.7269+00	1.4361+03	1.4326+03
20	1.5688+03	1.5651+03	3.3966+01	9.8340-01	1.5678+03	1.5664+03
21	1.6838+03	1.6827+03	5.3468+01	3.1149-01	1.6841+03	1.6829+03
22	1.6848+03	1.6834+03	5.3501+01	2.1312-01	1.6864+03	1.6837+03
23	1.6977+03	1.6941+03	5.6127+01	6.1851-01	1.6975+03	1.6961+03
24	1.7092+03	1.7065+03	5.9039+01	8.8482-01	1.7095+03	1.7084+03
25	1.7039+03	1.7005+03	5.7623+01	8.0202-01	1.7039+03	1.7022+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	735	737	739	741	746	747
	HCOT-A	HCAIT	HCAIT	HCAITA	HCAOTS	HCAOT-NE
1	1.5569+03	1.0738+02	9.4622+01	1.0100+02	1.3427+03	1.3418+03
2	1.5537+03	2.9873+02	2.2261+02	2.6067+02	1.0873+03	1.0805+03
3	1.5480+03	1.1076+03	8.6851+02	9.8803+02	5.9962+02	6.0635+02
4	1.5390+03	1.1105+03	8.8501+02	9.9773+02	3.8662+02	3.9762+02
5	1.5297+03	1.1040+03	8.7945+02	9.9171+02	3.3164+02	3.5188+02
6	1.6053+03	1.1722+02	1.0886+02	1.1304+02	1.4200+03	1.4165+03
7	1.6500+03	1.0936+02	1.0130+02	1.0518+02	1.4597+03	1.4570+03
8	1.7013+03	1.2280+03	1.0097+03	1.1188+03	3.9183+02	4.0371+02
9	1.7017+03	1.3136+02	1.1596+02	1.2366+02	1.4548+03	1.4504+03
10	1.6861+03	1.2890+02	1.1922+02	1.2406+02	1.4656+03	1.4643+03
11	1.6802+03	9.8406+01	9.4886+01	9.6646+01	1.4404+03	1.4417+03
12	1.6888+03	8.8022+01	8.4502+01	8.6262+01	1.4423+03	1.4441+03
13	1.6908+03	8.8440+01	8.4480+01	8.6460+01	1.4449+03	1.4462+03
14	1.6829+03	8.7010+01	8.3490+01	8.5250+01	1.4369+03	1.4391+03
15	1.6808+03	8.6680+01	8.3160+01	8.4920+01	1.4348+03	1.4366+03
16	1.6611+03	8.5998+01	8.2918+01	8.4458+01	1.4187+03	1.4209+03
17	1.5532+03	8.5932+01	8.2412+01	8.4172+01	1.3528+03	1.3541+03
18	1.4755+03	8.4810+01	8.1730+01	8.3270+01	1.2991+03	1.3008+03
19	1.4343+03	8.4370+01	8.1290+01	8.2830+01	1.2627+03	1.2649+03
20	1.5671+03	8.4788+01	8.1268+01	8.3028+01	1.3500+03	1.3513+03
21	1.6835+03	3.4226+02	2.5837+02	3.0032+02	1.1571+03	1.1495+03
22	1.6850+03	3.4992+02	2.6570+02	3.0781+02	1.1472+03	1.1401+03
23	1.6968+03	1.3191+02	1.2091+02	1.2641+02	1.4642+03	1.4602+03
24	1.7090+03	1.2256+02	1.1772+02	1.2014+02	1.5147+03	1.5138+03
25	1.7030+03	1.2023+02	1.1583+02	1.1803+02	1.5150+03	1.5141+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	748	749	751	755	756	757
	HCAOTN	HCAOTH	HCAOTA	HCCAOT	HCCAOT	HCCAOT
1	1.3321+03	1.3206+03	1.3343+03	8.9782+01	8.8022+01	8.9342+01
2	1.0732+03	1.0437+03	1.0712+03	1.0789+02	1.0481+02	1.1229+02
3	5.7963+02	5.4839+02	5.8350+02	1.0463+02	1.0463+02	1.1387+02
4	3.6858+02	3.5038+02	3.7580+02	1.0666+02	1.0798+02	1.1634+02
5	3.0509+02	2.9849+02	3.2177+02	1.0897+02	1.1073+02	1.2041+02
6	1.4114+03	1.4017+03	1.4124+03	1.0622+02	1.0490+02	1.0534+02
7	1.4518+03	1.4403+03	1.4522+03	9.7922+01	9.7042+01	9.7922+01
8	3.6851+02	3.5399+02	3.7951+02	9.6910+01	9.8230+01	1.0879+02
9	1.4425+03	1.4267+03	1.4436+03	1.0672+02	1.0496+02	1.0804+02
10	1.4559+03	1.4440+03	1.4574+03	1.1394+02	1.1262+02	1.1438+02
11	1.4351+03	1.4346+03	1.4379+03	9.5326+01	9.4446+01	9.4006+01
12	1.4370+03	1.4375+03	1.4402+03	8.5382+01	8.3182+01	8.3622+01
13	1.4392+03	1.4392+03	1.4424+03	8.4920+01	8.3600+01	8.3600+01
14	1.4316+03	1.4320+03	1.4349+03	8.3930+01	8.3050+01	8.2610+01
15	1.4295+03	1.4300+03	1.4327+03	8.3600+01	8.2280+01	8.2280+01
16	1.4143+03	1.4143+03	1.4171+03	8.3358+01	8.2038+01	8.1598+01
17	1.3476+03	1.3485+03	1.3507+03	8.3292+01	8.1972+01	8.1972+01
18	1.2947+03	1.2951+03	1.2974+03	8.2610+01	8.0850+01	8.0850+01
19	1.2587+03	1.2600+03	1.2616+03	8.2610+01	8.0410+01	8.0410+01
20	1.3451+03	1.3447+03	1.3478+03	8.1708+01	8.0828+01	8.0388+01
21	1.1415+03	1.1119+03	1.1400+03	1.1253+02	1.1033+02	1.1781+02
22	1.1313+03	1.0986+03	1.1293+03	1.1370+02	1.1150+02	1.1854+02
23	1.4519+03	1.4387+03	1.4537+03	1.1431+02	1.1211+02	1.1475+02
24	1.5081+03	1.4993+03	1.5090+03	1.1552+02	1.1464+02	1.1552+02
25	1.5079+03	1.5027+03	1.5099+03	1.1451+02	1.1407+02	1.1495+02

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	759	766	770	777	779
	HCCAOA	WA	QA	DTLMHC	UCHC
1	8.9049+01	4.0818-02	1.2819+01	6.5653+02	9.7986+00
2	1.0833+02	0.	0.	8.2189+02	0.
3	1.0771+02	0.	-0.	7.4347+02	-0.
4	1.1032+02	0.	-0.	8.1201+02	-0.
5	1.1337+02	0.	-0.	8.2679+02	-0.
6	1.0548+02	6.2413-02	2.0754+01	6.3445+02	1.6416+01
7	9.7629+01	6.7322-02	2.3249+01	6.5526+02	1.7806+01
8	1.0131+02	7.7431-03	-1.4607+00	9.0233+02	-8.1236-01
9	1.0658+02	4.0149-02	1.3592+01	7.2868+02	9.3609+00
10	1.1364+02	5.1283-02	1.7551+01	6.9384+02	1.2694+01
11	9.4593+01	1.9194-01	6.5927+01	7.1448+02	4.6307+01
12	8.4062+01	1.9458-01	6.7439+01	7.2646+02	4.6587+01
13	8.4040+01	1.9439-01	6.7479+01	7.2660+02	4.6606+01
14	8.3197+01	1.9454-01	6.7188+01	7.2402+02	4.6570+01
15	8.2720+01	1.9443-01	6.7048+01	7.2390+02	4.6481+01
16	8.2331+01	1.9502-01	6.6438+01	7.1421+02	4.6683+01
17	8.2412+01	1.9501-01	6.2904+01	6.4963+02	4.8594+01
18	8.1437+01	1.9519-01	6.0172+01	6.0804+02	4.9662+01
19	8.1143+01	1.9524-01	5.8313+01	5.9308+02	4.9342+01
20	8.0975+01	1.2909-01	4.1572+01	6.6090+02	3.1567+01
21	1.1356+02	0.	0.	8.9862+02	0.
22	1.1458+02	0.	0.	9.0454+02	0.
23	1.1373+02	4.4406-02	1.5127+01	7.1062+02	1.0683+01
24	1.1523+02	8.3258-02	2.9757+01	6.6945+02	2.2307+01
25	1.1451+02	1.0489-01	3.7571+01	6.6049+02	2.8546+01

TABLE A-2

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	202	203	860	861	862	863
	DATE	TIME	PIT-I	POT-I	PIT-I	PIT-I
1	6.3040+00	4.3000+02	1.6094+03	1.5948+03	1.6092+03	1.6088+03
2	6.3040+00	8.3000+02	1.6356+03	1.6131+03	1.6361+03	1.6357+03
3	6.3040+00	1.1300+03	1.6696+03	1.6399+03	1.6693+03	1.6690+03
4	6.3040+00	1.4300+03	1.6995+03	1.6622+03	1.6991+03	1.6984+03
5	6.3040+00	1.6000+03	1.7194+03	1.6771+03	1.7189+03	1.7185+03
6	6.3040+00	1.8000+03	1.7380+03	1.6921+03	1.7377+03	1.7370+03
7	6.3040+00	1.9300+03	1.7587+03	1.7077+03	1.7584+03	1.7580+03
8	6.3040+00	2.0450+03	1.7761+03	1.7228+03	1.7760+03	1.7755+03
9	6.3040+00	2.1300+03	1.7783+03	1.7239+03	1.7780+03	1.7774+03
10	6.3040+00	2.2000+03	1.7878+03	1.7314+03	1.7879+03	1.7871+03
11	6.3040+00	2.3000+03	1.8097+03	1.7497+03	1.8099+03	1.8095+03
12	7.0140+00	1.0000+03	1.6136+03	1.6001+03	1.6159+03	1.6153+03
13	7.0140+00	1.0300+03	1.6079+03	1.5917+03	1.6074+03	1.6072+03
14	7.0140+00	1.1300+03	1.6108+03	1.5950+03	1.6103+03	1.6101+03
15	7.0140+00	1.4000+03	1.6235+03	1.6079+03	1.6230+03	1.6225+03
16	7.0140+00	1.7300+03	1.6211+03	1.5988+03	1.6207+03	1.6203+03
17	7.0140+00	1.9300+03	1.6591+03	1.6257+03	1.6586+03	1.6582+03
18	7.0164+00	2.1000+03	1.6752+03	1.6380+03	1.6749+03	1.6743+03
19	7.0140+00	2.1200+03	1.6878+03	1.6554+03	1.6877+03	1.6873+03
20	7.0140+00	2.1300+03	1.6936+03	1.6599+03	1.6935+03	1.6931+03
21	7.0140+00	2.1550+03	1.6901+03	1.6494+03	1.6896+03	1.6891+03
22	7.0140+00	2.2250+03	1.6774+03	1.6383+03	1.6771+03	1.6766+03
23	7.0240+00	3.3000+02	1.6861+03	1.6565+03	1.6858+03	1.6854+03
24	7.0240+00	6.3000+02	1.6638+03	1.6300+03	1.6635+03	1.6631+03
25	7.0240+00	7.3000+02	1.6641+03	1.6263+03	1.6638+03	1.6637+03
26	7.0240+00	9.3000+02	1.6875+03	1.6149+03	1.6877+03	1.6873+03
27	7.0240+00	8.3000+02	1.6726+03	1.6276+03	1.6721+03	1.6721+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	864	800	801	802	804	805
	PCT-I	BW 91	BW 91	BW 91	BW 91	BW91-A
1	1.5950+03	1.6010+03	1.6002+03	1.5986+03	1.5984+03	1.5995+03
2	1.6138+03	1.6221+03	1.6217+03	1.6194+03	1.6194+03	1.6206+03
3	1.6406+03	1.6511+03	1.6503+03	1.6483+03	1.6476+03	1.6493+03
4	1.6628+03	1.6750+03	1.6739+03	1.6719+03	1.6719+03	1.6732+03
5	1.6774+03	1.6920+03	1.6907+03	1.6871+03	1.6880+03	1.6894+03
6	1.6927+03	1.7063+03	1.7062+03	1.7022+03	1.7032+03	1.7045+03
7	1.7081+03	1.7200+03	1.7207+03	1.7166+03	1.7184+03	1.7189+03
8	1.7226+03	1.7356+03	1.7358+03	1.7313+03	1.7339+03	1.7342+03
9	1.7246+03	1.7393+03	1.7380+03	1.7324+03	1.7351+03	1.7362+03
10	1.7323+03	1.7473+03	1.7469+03	1.7417+03	1.7431+03	1.7447+03
11	1.7503+03	1.7693+03	1.7667+03	1.7625+03	1.7636+03	1.7655+03
12	1.6008+03	1.6043+03	1.6035+03	1.6009+03	1.6027+03	1.6029+03
13	1.5921+03	1.5961+03	1.5961+03	1.5927+03	1.5947+03	1.5949+03
14	1.5955+03	1.6003+03	1.5998+03	1.5964+03	1.5981+03	1.5987+03
15	1.6082+03	1.6133+03	1.6132+03	1.6096+03	1.6112+03	1.6118+03
16	1.5995+03	1.6061+03	1.6061+03	1.6028+03	1.6030+03	1.6045+03
17	1.6262+03	1.6336+03	1.6340+03	1.6303+03	1.6329+03	1.6327+03
18	1.6385+03	1.6485+03	1.6486+03	1.6434+03	1.6473+03	1.6470+03
19	1.6560+03	1.6757+03	1.6741+03	1.6665+03	1.6712+03	1.6719+03
20	1.6603+03	1.6775+03	1.6777+03	1.6708+03	1.6760+03	1.6755+03
21	1.6500+03	1.6606+03	1.6612+03	1.6555+03	1.6609+03	1.6596+03
22	1.6390+03	1.6474+03	1.6479+03	1.6433+03	1.6472+03	1.6465+03
23	1.6571+03	1.6651+03	1.6646+03	1.6605+03	1.6635+03	1.6634+03
24	1.6304+03	1.6376+03	1.6394+03	1.6343+03	1.6372+03	1.6371+03
25	1.6269+03	1.6359+03	1.6350+03	1.6313+03	1.6341+03	1.6341+03
26	1.6154+03	1.6278+03	1.6299+03	1.6242+03	1.6291+03	1.6277+03
27	1.6285+03	1.6380+03	1.6394+03	1.6338+03	1.6372+03	1.6371+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	806	807	808	809	810	811
	BW 84	BW 84	BW 84	BW 84	BW84-A	BW 77
1	1.6026+03	1.6009+03	1.6046+03	1.6027+03	1.6027+03	1.5981+03
2	1.6245+03	1.6223+03	1.6257+03	1.6237+03	1.6240+03	1.6202+03
3	1.6536+03	1.6514+03	1.6543+03	1.6528+03	1.6530+03	1.6492+03
4	1.6783+03	1.6760+03	1.6784+03	1.6768+03	1.6774+03	1.6739+03
5	1.6942+03	1.6921+03	1.6948+03	1.6927+03	1.6934+03	1.6912+03
6	1.7099+03	1.7076+03	1.7100+03	1.7074+03	1.7087+03	1.7063+03
7	1.7257+03	1.7233+03	1.7249+03	1.7228+03	1.7242+03	1.7222+03
8	1.7405+03	1.7392+03	1.7394+03	1.7383+03	1.7393+03	1.7382+03
9	1.7415+03	1.7399+03	1.7415+03	1.7387+03	1.7404+03	1.7408+03
10	1.7507+03	1.7488+03	1.7502+03	1.7478+03	1.7494+03	1.7484+03
11	1.7720+03	1.7707+03	1.7715+03	1.7693+03	1.7709+03	1.7706+03
12	1.6056+03	1.6046+03	1.6077+03	1.6068+03	1.6062+03	1.6019+03
13	1.5974+03	1.5969+03	1.5996+03	1.5985+03	1.5981+03	1.5938+03
14	1.6010+03	1.6000+03	1.6033+03	1.6016+03	1.6015+03	1.5976+03
15	1.6144+03	1.6133+03	1.6164+03	1.6155+03	1.6149+03	1.6106+03
16	1.6080+03	1.6063+03	1.6088+03	1.6070+03	1.6075+03	1.6036+03
17	1.6374+03	1.6360+03	1.6376+03	1.6362+03	1.6368+03	1.6340+03
18	1.6524+03	1.6509+03	1.6515+03	1.6499+03	1.6512+03	1.6501+03
19	1.6784+03	1.6784+03	1.6768+03	1.6757+03	1.6773+03	1.6773+03
20	1.6821+03	1.6817+03	1.6807+03	1.6799+03	1.6811+03	1.6818+03
21	1.6648+03	1.6628+03	1.6640+03	1.6622+03	1.6635+03	1.6630+03
22	1.6511+03	1.6494+03	1.6508+03	1.6493+03	1.6501+03	1.6489+03
23	1.6675+03	1.6653+03	1.6678+03	1.6661+03	1.6667+03	1.6647+03
24	1.6412+03	1.6397+03	1.6419+03	1.6401+03	1.6407+03	1.6391+03
25	1.6389+03	1.6366+03	1.6389+03	1.6368+03	1.6378+03	1.6350+03
26	1.6351+03	1.6341+03	1.6366+03	1.6326+03	1.6346+03	1.6370+03
27	1.6413+03	1.6402+03	1.6408+03	1.6396+03	1.6405+03	1.6398+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	812	813	814	815	816	817
	BW 77	BW 77	BW 77	BW77-A	BW 70	BW 70
1	1.6017+03	1.5980+03	1.6019+03	1.5999+03	1.5973+03	1.5981+03
2	1.6235+03	1.6187+03	1.6233+03	1.6215+03	1.6188+03	1.6207+03
3	1.6526+03	1.6475+03	1.6526+03	1.6505+03	1.6482+03	1.6499+03
4	1.6776+03	1.6723+03	1.6775+03	1.6753+03	1.6735+03	1.6753+03
5	1.6954+03	1.6883+03	1.6952+03	1.6925+03	1.6905+03	1.6924+03
6	1.7096+03	1.7037+03	1.7099+03	1.7074+03	1.7053+03	1.7088+03
7	1.7249+03	1.7191+03	1.7231+03	1.7223+03	1.7228+03	1.7253+03
8	1.7408+03	1.7336+03	1.7399+03	1.7381+03	1.7385+03	1.7421+03
9	1.7426+03	1.7354+03	1.7419+03	1.7402+03	1.7400+03	1.7443+03
10	1.7510+03	1.7440+03	1.7502+03	1.7484+03	1.7490+03	1.7529+03
11	1.7736+03	1.7669+03	1.7736+03	1.7712+03	1.7726+03	1.7755+03
12	1.6053+03	1.6007+03	1.6052+03	1.6033+03	1.6023+03	1.6029+03
13	1.5971+03	1.5928+03	1.5962+03	1.5950+03	1.5942+03	1.5947+03
14	1.6008+03	1.5961+03	1.5999+03	1.5986+03	1.5979+03	1.5982+03
15	1.6141+03	1.6099+03	1.6138+03	1.6121+03	1.6108+03	1.6113+03
16	1.6064+03	1.6017+03	1.6068+03	1.6046+03	1.6029+03	1.6050+03
17	1.6369+03	1.6315+03	1.6354+03	1.6344+03	1.6339+03	1.6361+03
18	1.6518+03	1.6454+03	1.6516+03	1.6497+03	1.6492+03	1.6538+03
19	1.6803+03	1.6722+03	1.6791+03	1.6772+03	1.6785+03	1.6799+03
20	1.6852+03	1.6766+03	1.6815+03	1.6813+03	1.6842+03	1.6856+03
21	1.6652+03	1.6580+03	1.6649+03	1.6628+03	1.6623+03	1.6656+03
22	1.6516+03	1.6445+03	1.6499+03	1.6487+03	1.6477+03	1.6512+03
23	1.6673+03	1.6612+03	1.6665+03	1.6649+03	1.6642+03	1.6660+03
24	1.6412+03	1.6354+03	1.6386+03	1.6386+03	1.6381+03	1.6407+03
25	1.6374+03	1.6319+03	1.6384+03	1.6357+03	1.6345+03	1.6383+03
26	1.6379+03	1.6332+03	1.6358+03	1.6360+03	1.6389+03	1.6406+03
27	1.6412+03	1.6341+03	1.6396+03	1.6387+03	1.6376+03	1.6425+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	818	819	943	820	821	822
	BW 70	BW 70	BW 70	BW70-A	BW 63	BW 63
1	1.5976+03	1.6013+03	1.6007+03	1.5990+03	1.5986+03	1.5979+03
2	1.6197+03	1.6236+03	1.6228+03	1.6211+03	1.6210+03	1.6207+03
3	1.6497+03	1.6533+03	1.6519+03	1.6506+03	1.6510+03	1.6505+03
4	1.6743+03	1.6787+03	1.6765+03	1.6757+03	1.6754+03	1.6770+03
5	1.6926+03	1.6968+03	1.6942+03	1.6933+03	1.6947+03	1.6946+03
6	1.7072+03	1.7112+03	1.7089+03	1.7083+03	1.7094+03	1.7104+03
7	1.7240+03	1.7284+03	1.7253+03	1.7251+03	1.7262+03	1.7270+03
8	1.7389+03	1.7451+03	1.7411+03	1.7411+03	1.7422+03	1.7438+03
9	1.7399+03	1.7458+03	1.7424+03	1.7425+03	1.7417+03	1.7458+03
10	1.7515+03	1.7546+03	1.7517+03	1.7519+03	1.7540+03	1.7553+03
11	1.7745+03	1.7783+03	1.7748+03	1.7752+03	1.7770+03	1.7797+03
12	1.6019+03	1.6060+03	1.6052+03	1.6036+03	1.6041+03	1.6024+03
13	1.5932+03	1.5979+03	1.5970+03	1.5954+03	1.5952+03	1.5943+03
14	1.5969+03	1.6014+03	1.6007+03	1.5991+03	1.5997+03	1.5977+03
15	1.6106+03	1.6147+03	1.6138+03	1.6122+03	1.6118+03	1.6111+03
16	1.6039+03	1.6081+03	1.6060+03	1.6052+03	1.6044+03	1.6052+03
17	1.6350+03	1.6393+03	1.6373+03	1.6363+03	1.6365+03	1.6377+03
18	1.6509+03	1.6551+03	1.6533+03	1.6525+03	1.6528+03	1.6548+03
19	1.6784+03	1.6828+03	1.6811+03	1.6801+03	1.6813+03	1.6802+03
20	1.6828+03	1.6892+03	1.6868+03	1.6857+03	1.6862+03	1.6861+03
21	1.6643+03	1.6681+03	1.6663+03	1.6653+03	1.6664+03	1.6674+03
22	1.6489+03	1.6545+03	1.6513+03	1.6507+03	1.6505+03	1.6526+03
23	1.6641+03	1.6695+03	1.6671+03	1.6662+03	1.6667+03	1.6660+03
24	1.6374+03	1.6438+03	1.6411+03	1.6402+03	1.6395+03	1.6409+03
25	1.6363+03	1.6400+03	1.6384+03	1.6375+03	1.6378+03	1.6392+03
26	1.6357+03	1.6415+03	1.6401+03	1.6393+03	1.6394+03	1.6443+03
27	1.6386+03	1.6437+03	1.6419+03	1.6409+03	1.6411+03	1.6431+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	823	952	960	824	825	826
	BW 63	BW 63	BW 63	BW63-A	BW 58	BW 58
1	1.6018+03	1.6019+03	1.6010+03	1.6002+03	1.5979+03	1.5978+03
2	1.6238+03	1.6232+03	1.6236+03	1.6225+03	1.6209+03	1.6198+03
3	1.6540+03	1.6518+03	1.6532+03	1.6521+03	1.6510+03	1.6494+03
4	1.6796+03	1.6764+03	1.6784+03	1.6774+03	1.6768+03	1.6756+03
5	1.6974+03	1.6942+03	1.6969+03	1.6955+03	1.6953+03	1.6933+03
6	1.7124+03	1.7082+03	1.7113+03	1.7104+03	1.7102+03	1.7085+03
7	1.7286+03	1.7244+03	1.7282+03	1.7269+03	1.7282+03	1.7251+03
8	1.7443+03	1.7398+03	1.7446+03	1.7430+03	1.7428+03	1.7406+03
9	1.7460+03	1.7428+03	1.7466+03	1.7446+03	1.7445+03	1.7437+03
10	1.7563+03	1.7504+03	1.7557+03	1.7543+03	1.7549+03	1.7527+03
11	1.7803+03	1.7736+03	1.7795+03	1.7780+03	1.7798+03	1.7766+03
12	1.6061+03	1.6063+03	1.6056+03	1.6049+03	1.6027+03	1.6019+03
13	1.5980+03	1.5981+03	1.5972+03	1.5965+03	1.5947+03	1.5936+03
14	1.6016+03	1.6016+03	1.6007+03	1.6002+03	1.5982+03	1.5971+03
15	1.6150+03	1.6145+03	1.6137+03	1.6132+03	1.6112+03	1.6101+03
16	1.6076+03	1.6061+03	1.6069+03	1.6060+03	1.6035+03	1.6027+03
17	1.6399+03	1.6372+03	1.6390+03	1.6381+03	1.6368+03	1.6347+03
18	1.6561+03	1.6528+03	1.6560+03	1.6545+03	1.6535+03	1.6524+03
19	1.6837+03	1.6818+03	1.6827+03	1.6819+03	1.6814+03	1.6798+03
20	1.6901+03	1.6875+03	1.6886+03	1.6877+03	1.6872+03	1.6861+03
21	1.6693+03	1.6664+03	1.6689+03	1.6677+03	1.6673+03	1.6657+03
22	1.6536+03	1.6516+03	1.6543+03	1.6525+03	1.6511+03	1.6501+03
23	1.6685+03	1.6662+03	1.6686+03	1.6672+03	1.6663+03	1.6643+03
24	1.6429+03	1.6413+03	1.6433+03	1.6416+03	1.6403+03	1.6387+03
25	1.6408+03	1.6386+03	1.6407+03	1.6394+03	1.6376+03	1.6367+03
26	1.6458+03	1.6460+03	1.6451+03	1.6441+03	1.6465+03	1.6499+03
27	1.6447+03	1.6417+03	1.6446+03	1.6430+03	1.6425+03	1.6404+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	827	828	829	830	831	832
	BW 58	BW 58	BW 58	BW 58	BW58-A	BW 50
1	1.5992+03	1.5989+03	1.5981+03	1.6013+03	1.5989+03	1.5995+03
2	1.6220+03	1.6226+03	1.6210+03	1.6244+03	1.6218+03	1.6225+03
3	1.6529+03	1.6523+03	1.6508+03	1.6543+03	1.6518+03	1.6527+03
4	1.6793+03	1.6799+03	1.6769+03	1.6799+03	1.6781+03	1.6789+03
5	1.6977+03	1.6982+03	1.6939+03	1.6971+03	1.6959+03	1.6981+03
6	1.7133+03	1.7141+03	1.7101+03	1.7136+03	1.7116+03	1.7134+03
7	1.7295+03	1.7305+03	1.7277+03	1.7312+03	1.7287+03	1.7304+03
8	1.7468+03	1.7490+03	1.7445+03	1.7475+03	1.7452+03	1.7481+03
9	1.7478+03	1.7503+03	1.7459+03	1.7489+03	1.7469+03	1.7488+03
10	1.7587+03	1.7595+03	1.7560+03	1.7580+03	1.7566+03	1.7587+03
11	1.7822+03	1.7846+03	1.7793+03	1.7831+03	1.7809+03	1.7839+03
12	1.6032+03	1.6045+03	1.6031+03	1.6066+03	1.6037+03	1.6039+03
13	1.5948+03	1.5961+03	1.5949+03	1.5982+03	1.5954+03	1.5958+03
14	1.5983+03	1.5997+03	1.5984+03	1.6015+03	1.5989+03	1.5991+03
15	1.6115+03	1.6122+03	1.6114+03	1.6149+03	1.6119+03	1.6123+03
16	1.6051+03	1.6060+03	1.6051+03	1.6085+03	1.6052+03	1.6056+03
17	1.6385+03	1.6395+03	1.6384+03	1.6415+03	1.6382+03	1.6390+03
18	1.6563+03	1.6577+03	1.6548+03	1.6581+03	1.6555+03	1.6572+03
19	1.6809+03	1.6823+03	1.6800+03	1.6849+03	1.6815+03	1.6821+03
20	1.6871+03	1.6877+03	1.6862+03	1.6911+03	1.6876+03	1.6881+03
21	1.6695+03	1.6709+03	1.6694+03	1.6727+03	1.6692+03	1.6713+03
22	1.6546+03	1.6559+03	1.6539+03	1.6566+03	1.6537+03	1.6555+03
23	1.6676+03	1.6688+03	1.6672+03	1.6708+03	1.6675+03	1.6680+03
24	1.6422+03	1.6438+03	1.6415+03	1.6444+03	1.6418+03	1.6427+03
25	1.6403+03	1.6413+03	1.6398+03	1.6420+03	1.6396+03	1.6413+03
26	1.6499+03	1.6512+03	1.6488+03	1.6501+03	1.6494+03	1.6533+03
27	1.6441+03	1.6469+03	1.6448+03	1.6472+03	1.6443+03	1.6457+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	833	834	835	836	837	838
	BW 50	BW 50	BW 50	BW 50	BW50-A	BW 43
1	1.6002+03	1.5993+03	1.6002+03	1.6014+03	1.6001+03	1.5990+03
2	1.6249+03	1.6222+03	1.6246+03	1.6253+03	1.6239+03	1.6232+03
3	1.6548+03	1.6520+03	1.6555+03	1.6562+03	1.6542+03	1.6541+03
4	1.6821+03	1.6780+03	1.6813+03	1.6825+03	1.6806+03	1.6804+03
5	1.7015+03	1.6965+03	1.7012+03	1.7022+03	1.6999+03	1.7003+03
6	1.7169+03	1.7120+03	1.7155+03	1.7173+03	1.7150+03	1.7140+03
7	1.7347+03	1.7289+03	1.7327+03	1.7351+03	1.7324+03	1.7329+03
8	1.7535+03	1.7450+03	1.7495+03	1.7525+03	1.7497+03	1.7488+03
9	1.7550+03	1.7474+03	1.7494+03	1.7538+03	1.7509+03	1.7491+03
10	1.7639+03	1.7565+03	1.7618+03	1.7641+03	1.7610+03	1.7600+03
11	1.7894+03	1.7824+03	1.7860+03	1.7889+03	1.7861+03	1.7853+03
12	1.6060+03	1.6042+03	1.6046+03	1.6064+03	1.6050+03	1.6035+03
13	1.5974+03	1.5961+03	1.5967+03	1.5980+03	1.5968+03	1.5955+03
14	1.6009+03	1.5996+03	1.6003+03	1.6013+03	1.6003+03	1.5995+03
15	1.6136+03	1.6127+03	1.6131+03	1.6147+03	1.6133+03	1.6125+03
16	1.6077+03	1.6054+03	1.6066+03	1.6084+03	1.6067+03	1.6058+03
17	1.6417+03	1.6385+03	1.6414+03	1.6430+03	1.6407+03	1.6402+03
18	1.6608+03	1.6565+03	1.6590+03	1.6613+03	1.6590+03	1.6584+03
19	1.6825+03	1.6825+03	1.6824+03	1.6835+03	1.6826+03	1.6817+03
20	1.6884+03	1.6884+03	1.6882+03	1.6893+03	1.6885+03	1.6873+03
21	1.6750+03	1.6701+03	1.6722+03	1.6750+03	1.6727+03	1.6718+03
22	1.6602+03	1.6540+03	1.6572+03	1.6598+03	1.6574+03	1.6559+03
23	1.6709+03	1.6674+03	1.6701+03	1.6716+03	1.6696+03	1.6689+03
24	1.6466+03	1.6421+03	1.6452+03	1.6469+03	1.6447+03	1.6441+03
25	1.6450+03	1.6405+03	1.6432+03	1.6453+03	1.6430+03	1.6420+03
26	1.6588+03	1.6512+03	1.6516+03	1.6560+03	1.6542+03	1.6525+03
27	1.6516+03	1.6455+03	1.6484+03	1.6505+03	1.6483+03	1.6475+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	839	840	841	842	843	844
	BW 43	BW 43	BW 43	BW43-A	BW 36	BW 36
1	1.6013+03	1.6012+03	1.5999+03	1.6004+03	1.6002+03	1.6003+03
2	1.6245+03	1.6249+03	1.6247+03	1.6243+03	1.6254+03	1.6254+03
3	1.6548+03	1.6552+03	1.6559+03	1.6550+03	1.6568+03	1.6573+03
4	1.6817+03	1.6819+03	1.6830+03	1.6818+03	1.6848+03	1.6856+03
5	1.7000+03	1.7011+03	1.7026+03	1.7010+03	1.7054+03	1.7044+03
6	1.7162+03	1.7167+03	1.7186+03	1.7164+03	1.7201+03	1.7216+03
7	1.7331+03	1.7345+03	1.7363+03	1.7342+03	1.7389+03	1.7415+03
8	1.7507+03	1.7511+03	1.7547+03	1.7513+03	1.7562+03	1.7589+03
9	1.7520+03	1.7531+03	1.7559+03	1.7525+03	1.7585+03	1.7607+03
10	1.7619+03	1.7633+03	1.7662+03	1.7628+03	1.7682+03	1.7703+03
11	1.7871+03	1.7896+03	1.7911+03	1.7883+03	1.7940+03	1.7957+03
12	1.6068+03	1.6065+03	1.6052+03	1.6055+03	1.6055+03	1.6062+03
13	1.5989+03	1.5980+03	1.5969+03	1.5973+03	1.5976+03	1.5976+03
14	1.6019+03	1.6015+03	1.6004+03	1.6008+03	1.6016+03	1.6009+03
15	1.6148+03	1.6142+03	1.6134+03	1.6137+03	1.6142+03	1.6137+03
16	1.6085+03	1.6078+03	1.6076+03	1.6074+03	1.6089+03	1.6094+03
17	1.6423+03	1.6420+03	1.6430+03	1.6419+03	1.6451+03	1.6454+03
18	1.6609+03	1.6605+03	1.6612+03	1.6602+03	1.6633+03	1.6637+03
19	1.6838+03	1.6840+03	1.6816+03	1.6828+03	1.6824+03	1.6818+03
20	1.6894+03	1.6898+03	1.6873+03	1.6885+03	1.6881+03	1.6874+03
21	1.6743+03	1.6747+03	1.6753+03	1.6740+03	1.6778+03	1.6778+03
22	1.6591+03	1.6589+03	1.6605+03	1.6586+03	1.6623+03	1.6636+03
23	1.6708+03	1.6705+03	1.6713+03	1.6704+03	1.6727+03	1.6733+03
24	1.6458+03	1.6456+03	1.6467+03	1.6456+03	1.6486+03	1.6491+03
25	1.6449+03	1.6443+03	1.6453+03	1.6441+03	1.6475+03	1.6493+03
26	1.6598+03	1.6612+03	1.6617+03	1.6588+03	1.6600+03	1.6699+03
27	1.6498+03	1.6499+03	1.6512+03	1.6496+03	1.6545+03	1.6561+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	845	846	970	847	848	849
	BW 36	BW 36	BW 36	BW36-A	BW 29	BW 29
1	1.6023+03	1.6031+03	1.6035+03	1.6019+03	1.6037+03	1.6036+03
2	1.6281+03	1.6279+03	1.6277+03	1.6269+03	1.6297+03	1.6291+03
3	1.6600+03	1.6592+03	1.6587+03	1.6584+03	1.6621+03	1.6618+03
4	1.6881+03	1.6871+03	1.6854+03	1.6862+03	1.6912+03	1.6905+03
5	1.7083+03	1.7055+03	1.7046+03	1.7056+03	1.7115+03	1.7094+03
6	1.7240+03	1.7223+03	1.7197+03	1.7215+03	1.7277+03	1.7271+03
7	1.7437+03	1.7419+03	1.7389+03	1.7410+03	1.7476+03	1.7472+03
8	1.7611+03	1.7597+03	1.7561+03	1.7584+03	1.7652+03	1.7651+03
9	1.7634+03	1.7603+03	1.7579+03	1.7601+03	1.7673+03	1.7664+03
10	1.7738+03	1.7710+03	1.7678+03	1.7702+03	1.7775+03	1.7766+03
11	1.7982+03	1.7967+03	1.7937+03	1.7957+03	1.8015+03	1.8013+03
12	1.6081+03	1.6087+03	1.6092+03	1.6075+03	1.6094+03	1.6094+03
13	1.5997+03	1.6005+03	1.6008+03	1.5992+03	1.6008+03	1.6011+03
14	1.6035+03	1.6037+03	1.6043+03	1.6028+03	1.6046+03	1.6045+03
15	1.6162+03	1.6168+03	1.6170+03	1.6156+03	1.6172+03	1.6173+03
16	1.6114+03	1.6117+03	1.6115+03	1.6106+03	1.6130+03	1.6137+03
17	1.6483+03	1.6470+03	1.6464+03	1.6464+03	1.6503+03	1.6503+03
18	1.6659+03	1.6660+03	1.6652+03	1.6648+03	1.6681+03	1.6685+03
19	1.6837+03	1.6858+03	1.6859+03	1.6839+03	1.6845+03	1.6850+03
20	1.6895+03	1.6916+03	1.6917+03	1.6897+03	1.6901+03	1.6907+03
21	1.6808+03	1.6794+03	1.6792+03	1.6790+03	1.6832+03	1.6821+03
22	1.6663+03	1.6643+03	1.6634+03	1.6640+03	1.6689+03	1.6683+03
23	1.6763+03	1.6754+03	1.6744+03	1.6744+03	1.6781+03	1.6781+03
24	1.6522+03	1.6503+03	1.6501+03	1.6501+03	1.6544+03	1.6541+03
25	1.6513+03	1.6500+03	1.6491+03	1.6495+03	1.6541+03	1.6541+03
26	1.6698+03	1.6712+03	1.6654+03	1.6673+03	1.6749+03	1.6759+03
27	1.6590+03	1.6567+03	1.6551+03	1.6563+03	1.6617+03	1.6611+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	850	851	852	853	855	856
	BW 29	BW29-A	BW 23	BW 23	BW 23	BW 23
1	1.6050+03	1.6041+03	1.6046+03	1.6023+03	1.6025+03	1.6048+03
2	1.6308+03	1.6299+03	1.6316+03	1.6274+03	1.6289+03	1.6309+03
3	1.6620+03	1.6620+03	1.6647+03	1.6594+03	1.6613+03	1.6642+03
4	1.6899+03	1.6905+03	1.6939+03	1.6869+03	1.6898+03	1.6933+03
5	1.7094+03	1.7101+03	1.7137+03	1.7065+03	1.7088+03	1.7130+03
6	1.7256+03	1.7268+03	1.7315+03	1.7239+03	1.7264+03	1.7312+03
7	1.7448+03	1.7465+03	1.7523+03	1.7438+03	1.7465+03	1.7515+03
8	1.7617+03	1.7640+03	1.7697+03	1.7622+03	1.7642+03	1.7693+03
9	1.7641+03	1.7660+03	1.7718+03	1.7627+03	1.7656+03	1.7711+03
10	1.7745+03	1.7762+03	1.7817+03	1.7718+03	1.7756+03	1.7812+03
11	1.8001+03	1.8010+03	1.8054+03	1.7965+03	1.8005+03	1.8046+03
12	1.6107+03	1.6098+03	1.6103+03	1.6078+03	1.6082+03	1.6104+03
13	1.6028+03	1.6016+03	1.6022+03	1.5998+03	1.6001+03	1.6018+03
14	1.6064+03	1.6052+03	1.6055+03	1.6031+03	1.6034+03	1.6057+03
15	1.6189+03	1.6178+03	1.6182+03	1.6155+03	1.6160+03	1.6181+03
16	1.6141+03	1.6136+03	1.6150+03	1.6119+03	1.6123+03	1.6149+03
17	1.6508+03	1.6505+03	1.6527+03	1.6486+03	1.6490+03	1.6530+03
18	1.6685+03	1.6684+03	1.6702+03	1.6663+03	1.6673+03	1.6702+03
19	1.6868+03	1.6854+03	1.6847+03	1.6826+03	1.6839+03	1.6847+03
20	1.6924+03	1.6911+03	1.6907+03	1.6882+03	1.6897+03	1.6906+03
21	1.6832+03	1.6828+03	1.6848+03	1.6805+03	1.6815+03	1.6848+03
22	1.6679+03	1.6683+03	1.6712+03	1.6654+03	1.6668+03	1.6711+03
23	1.6784+03	1.6782+03	1.6803+03	1.6757+03	1.6770+03	1.6804+03
24	1.6542+03	1.6542+03	1.6568+03	1.6525+03	1.6531+03	1.6567+03
25	1.6535+03	1.6539+03	1.6571+03	1.6523+03	1.6527+03	1.6571+03
26	1.6713+03	1.6740+03	1.6806+03	1.6732+03	1.6747+03	1.6806+03
27	1.6607+03	1.6612+03	1.6651+03	1.6605+03	1.6610+03	1.6651+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	857	858	859	866	867	868
	BW 23	BW 23	BW-23A	SIT-I	SIT-I	SOT-I
1	1.6029+03	1.6054+03	1.6038+03	1.3908+03	1.3899+03	1.5571+03
2	1.6291+03	1.6323+03	1.6300+03	1.3729+03	1.3722+03	1.5504+03
3	1.6620+03	1.6643+03	1.6626+03	1.3724+03	1.3712+03	1.5500+03
4	1.6902+03	1.6930+03	1.6912+03	1.3682+03	1.3673+03	1.5466+03
5	1.7095+03	1.7121+03	1.7106+03	1.3558+03	1.3545+03	1.5349+03
6	1.7272+03	1.7301+03	1.7284+03	1.3558+03	1.3550+03	1.5362+03
7	1.7467+03	1.7503+03	1.7485+03	1.3494+03	1.3487+03	1.5339+03
8	1.7647+03	1.7688+03	1.7665+03	1.3467+03	1.3455+03	1.5411+03
9	1.7663+03	1.7703+03	1.7680+03	1.3590+03	1.3580+03	1.5332+03
10	1.7767+03	1.7802+03	1.7779+03	1.3484+03	1.3474+03	1.5278+03
11	1.8021+03	1.8045+03	1.8023+03	1.3350+03	1.3342+03	1.5220+03
12	1.6087+03	1.6115+03	1.6095+03	1.3709+03	1.3697+03	1.5587+03
13	1.6000+03	1.6035+03	1.6012+03	1.3274+03	1.3267+03	1.5528+03
14	1.6037+03	1.6067+03	1.6047+03	1.2772+03	1.2760+03	1.5592+03
15	1.6163+03	1.6196+03	1.6173+03	1.2562+03	1.2553+03	1.5776+03
16	1.6126+03	1.6161+03	1.6138+03	1.2152+03	1.2147+03	1.5347+03
17	1.6502+03	1.6533+03	1.6511+03	1.1908+03	1.1900+03	1.5283+03
18	1.6679+03	1.6712+03	1.6689+03	1.1905+03	1.1900+03	1.5113+03
19	1.6841+03	1.6874+03	1.6845+03	1.1819+03	1.1814+03	1.5051+03
20	1.6898+03	1.6929+03	1.6903+03	1.1749+03	1.1746+03	1.5007+03
21	1.6824+03	1.6845+03	1.6831+03	1.1692+03	1.1685+03	1.4807+03
22	1.6678+03	1.6713+03	1.6689+03	1.2006+03	1.1999+03	1.5072+03
23	1.6777+03	1.6809+03	1.6787+03	1.2486+03	1.2476+03	1.5851+03
24	1.6535+03	1.6575+03	1.6550+03	1.2275+03	1.2270+03	1.5476+03
25	1.6533+03	1.6566+03	1.6549+03	1.2396+03	1.2387+03	1.5412+03
26	1.6737+03	1.6813+03	1.6773+03	1.2175+03	1.2170+03	1.5130+03
27	1.6612+03	1.6651+03	1.6630+03	1.2263+03	1.2254+03	1.5411+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	869	870	871	872	873	874
	SCT-I	BI 13	BI 21	BI 35	BI 49	BI 63
1	1.5576+03	1.5580+03	1.5620+03	1.5655+03	1.5686+03	1.5695+03
2	1.5506+03	1.5512+03	1.5617+03	1.5714+03	1.5762+03	1.5779+03
3	1.5509+03	1.5505+03	1.5685+03	1.5848+03	1.5930+03	1.5958+03
4	1.5468+03	1.5483+03	1.5737+03	1.5967+03	1.6071+03	1.6110+03
5	1.5352+03	1.5370+03	1.5716+03	1.5981+03	1.6088+03	1.6159+03
6	1.5367+03	1.5369+03	1.5776+03	1.6097+03	1.6233+03	1.6295+03
7	1.5339+03	1.5329+03	1.5792+03	1.6153+03	1.6313+03	1.6386+03
8	1.5413+03	1.5398+03	1.5859+03	1.6230+03	1.6403+03	1.6489+03
9	1.5334+03	1.5318+03	1.5849+03	1.6234+03	1.6411+03	1.6489+03
10	1.5283+03	1.5276+03	1.5846+03	1.6254+03	1.6445+03	1.6526+03
11	1.5227+03	1.5216+03	1.5852+03	1.6273+03	1.6456+03	1.6571+03
12	1.5593+03	1.5571+03	1.5637+03	1.5681+03	1.5712+03	1.5712+03
13	1.5532+03	1.5519+03	1.5568+03	1.5607+03	1.5638+03	1.5638+03
14	1.5598+03	1.5583+03	1.5622+03	1.5653+03	1.5680+03	1.5680+03
15	1.5780+03	1.5764+03	1.5786+03	1.5808+03	1.5830+03	1.5821+03
16	1.5349+03	1.5356+03	1.5439+03	1.5522+03	1.5570+03	1.5592+03
17	1.5287+03	1.5275+03	1.5446+03	1.5621+03	1.5722+03	1.5761+03
18	1.5120+03	1.5092+03	1.5315+03	1.5533+03	1.5666+03	1.5744+03
19	1.5058+03	1.6018+03	1.5077+03	1.5099+03	1.5230+03	1.5366+03
20	1.5014+03	1.4637+03	1.4870+03	1.5010+03	1.5250+03	1.5447+03
21	1.4812+03	1.4895+03	1.5307+03	1.5551+03	1.5692+03	1.5770+03
22	1.5078+03	1.5072+03	1.5383+03	1.5632+03	1.5759+03	1.5820+03
23	1.5855+03	1.5851+03	1.5947+03	1.6047+03	1.6113+03	1.6122+03
24	1.5478+03	1.5474+03	1.5615+03	1.5755+03	1.5830+03	1.5848+03
25	1.5418+03	1.5404+03	1.5547+03	1.5710+03	1.5789+03	1.5810+03
26	1.5137+03	1.5127+03	1.5368+03	1.5512+03	1.5587+03	1.5626+03
27	1.5414+03	1.5387+03	1.5557+03	1.5706+03	1.5789+03	1.5811+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	875	876	211	213	215	217
	BI 77	BI 91	BB	BB	BB	BH
1	1.5673+03	1.5471+03	1.3919+03	1.3987+03	1.3928+03	1.3532+03
2	1.5757+03	1.5604+03	1.3731+03	1.3815+03	1.3749+03	1.3425+03
3	1.5949+03	1.5894+03	1.3712+03	1.3799+03	1.3724+03	1.3462+03
4	1.6102+03	1.6119+03	1.3691+03	1.3782+03	1.3695+03	1.3444+03
5	1.6159+03	1.6172+03	1.3569+03	1.3665+03	1.3577+03	1.3347+03
6	1.6295+03	1.6327+03	1.3577+03	1.3682+03	1.3585+03	1.3391+03
7	1.6386+03	1.6418+03	1.3521+03	1.3626+03	1.3530+03	1.3341+03
8	1.6489+03	1.6516+03	1.3485+03	1.3600+03	1.3494+03	1.3367+03
9	1.6493+03	1.6519+03	1.3616+03	1.3721+03	1.3620+03	1.3379+03
10	1.6534+03	1.6561+03	1.3517+03	1.3631+03	1.3521+03	1.3319+03
11	1.6584+03	1.6619+03	1.3382+03	1.3514+03	1.3391+03	1.3282+03
12	1.5703+03	1.5571+03	1.3725+03	1.3795+03	1.3734+03	1.3620+03
13	1.5630+03	1.5550+03	1.3331+03	1.3419+03	1.3336+03	1.3545+03
14	1.5667+03	1.5627+03	1.2779+03	1.2881+03	1.2792+03	1.3543+03
15	1.5808+03	1.5803+03	1.2563+03	1.2684+03	1.2572+03	1.3675+03
16	1.5570+03	1.5623+03	1.2169+03	1.2291+03	1.2173+03	1.3360+03
17	1.5752+03	1.5774+03	1.1924+03	1.2067+03	1.1924+03	1.3221+03
18	1.5749+03	1.5775+03	1.1938+03	1.2092+03	1.1933+03	1.3162+03
19	1.5440+03	1.5501+03	1.1861+03	1.2049+03	1.1861+03	1.3072+03
20	1.5561+03	1.5614+03	1.1820+03	1.2009+03	1.1816+03	1.2987+03
21	1.5796+03	1.5823+03	1.1688+03	1.1850+03	1.1692+03	1.2821+03
22	1.5820+03	1.5820+03	1.1997+03	1.2132+03	1.2006+03	1.3005+03
23	1.6104+03	1.6126+03	1.2477+03	1.2631+03	1.2481+03	1.3697+03
24	1.5839+03	1.5834+03	1.2287+03	1.2422+03	1.2287+03	1.3404+03
25	1.5797+03	1.5819+03	1.2396+03	1.2535+03	1.2404+03	1.3412+03
26	1.5626+03	1.5719+03	1.2202+03	1.2324+03	1.2206+03	1.3293+03
27	1.5798+03	1.5825+03	1.2278+03	1.2413+03	1.2278+03	1.3391+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	222	225	228	230	233	235
	PIT-A	POT-A	SIT-A	SOT-A	PFMST	PFMMT
1	1.6091+03	1.5949+03	1.3903+03	1.5573+03	1.5911+03	2.0545+02
2	1.6358+03	1.6134+03	1.3725+03	1.5505+03	1.6106+03	2.0694+02
3	1.6693+03	1.6403+03	1.3718+03	1.5505+03	1.6365+03	2.1944+02
4	1.6990+03	1.6625+03	1.3677+03	1.5467+03	1.6599+03	2.2648+02
5	1.7189+03	1.6773+03	1.3551+03	1.5351+03	1.6744+03	2.2780+02
6	1.7376+03	1.6924+03	1.3554+03	1.5364+03	1.6880+03	2.2204+02
7	1.7584+03	1.7079+03	1.3491+03	1.5339+03	1.7024+03	2.2107+02
8	1.7759+03	1.7227+03	1.3461+03	1.5412+03	1.7170+03	2.2358+02
9	1.7779+03	1.7243+03	1.3585+03	1.5333+03	1.7188+03	2.2441+02
10	1.7876+03	1.7318+03	1.3479+03	1.5281+03	1.7263+03	2.2547+02
11	1.8097+03	1.7500+03	1.3346+03	1.5224+03	1.7444+03	2.2736+02
12	1.6149+03	1.6004+03	1.3703+03	1.5590+03	1.5961+03	2.1640+02
13	1.6075+03	1.5919+03	1.3270+03	1.5530+03	1.5863+03	2.1742+02
14	1.6104+03	1.5953+03	1.2766+03	1.5595+03	1.5896+03	2.1847+02
15	1.6230+03	1.6080+03	1.2557+03	1.5778+03	1.6040+03	2.2349+02
16	1.6207+03	1.5991+03	1.2150+03	1.5348+03	1.5946+03	2.2204+02
17	1.6586+03	1.6259+03	1.1904+03	1.5285+03	1.6226+03	2.2230+02
18	1.6748+03	1.6382+03	1.1902+03	1.5117+03	1.6345+03	2.2146+02
19	1.6876+03	1.6557+03	1.1817+03	1.5054+03	1.6522+03	2.2129+02
20	1.6934+03	1.6601+03	1.1748+03	1.5010+03	1.6561+03	2.2155+02
21	1.6896+03	1.6497+03	1.1689+03	1.4810+03	1.6455+03	2.2102+02
22	1.6771+03	1.6386+03	1.2003+03	1.5075+03	1.6347+03	2.1988+02
23	1.6857+03	1.6568+03	1.2481+03	1.5853+03	1.6528+03	2.1310+02
24	1.6634+03	1.6302+03	1.2272+03	1.5477+03	1.6259+03	2.0932+02
25	1.6639+03	1.6266+03	1.2392+03	1.5415+03	1.6227+03	2.0967+02
26	1.6875+03	1.6151+03	1.2172+03	1.5133+03	1.6102+03	2.1403+02
27	1.6723+03	1.6280+03	1.2259+03	1.5412+03	1.6232+03	2.1060+02

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	237 SFMST	239 SFMMT	243 PFLO	247 SFLO	249 G-NA	251 G-K
1	1.3908+03	1.3385+02	6.9413+00	1.7579-01	1.4001+07	1.5665+05
2	1.3729+03	1.3534+02	6.9156+00	1.7123-01	1.3949+07	1.5258+05
3	1.3724+03	1.4432+02	6.9283+00	1.6310-01	1.3974+07	1.4534+05
4	1.3682+03	1.4784+02	6.8692+00	1.6099-01	1.3855+07	1.4345+05
5	1.3558+03	1.4652+02	6.9283+00	1.6274-01	1.3974+07	1.4501+05
6	1.3558+03	1.3812+02	6.9355+00	1.5644-01	1.3989+07	1.3940+05
7	1.3494+03	1.3715+02	6.8086+00	1.6039-01	1.3733+07	1.4292+05
8	1.3467+03	1.4142+02	6.7330+00	1.5422-01	1.3581+07	1.3742+05
9	1.3590+03	1.4357+02	6.8827+00	1.6071-01	1.3882+07	1.4321+05
10	1.3484+03	1.4419+02	6.8241+00	1.5635-01	1.3764+07	1.3932+05
11	1.3350+03	1.4476+02	6.7462+00	1.4784-01	1.3607+07	1.3174+05
12	1.3709+03	1.5184+02	6.9376+00	1.4871-01	1.3993+07	1.3252+05
13	1.3274+03	1.5242+02	6.8969+00	1.2315-01	1.3911+07	1.0973+05
14	1.2772+03	1.5171+02	6.9436+00	1.0188-01	1.4005+07	9.0785+04
15	1.2562+03	1.5277+02	6.9162+00	8.9403-02	1.3950+07	7.9666+04
16	1.2152+03	1.5000+02	6.9906+00	8.8904-02	1.4100+07	7.9222+04
17	1.1908+03	1.4806+02	6.9730+00	8.4588-02	1.4065+07	7.5376+04
18	1.1905+03	1.4502+02	6.9651+00	8.0535-02	1.4049+07	7.1764+04
19	1.1819+03	1.4397+02	6.9264+00	6.8378-02	1.3971+07	6.0931+04
20	1.1749+03	1.4335+02	6.9238+00	6.8317-02	1.3965+07	6.0876+04
21	1.1692+03	1.4194+02	6.9169+00	9.2353-02	1.3951+07	8.2295+04
22	1.2006+03	1.4168+02	6.9503+00	1.0278-01	1.4019+07	9.1583+04
23	1.2486+03	1.3622+02	6.9003+00	8.9179-02	1.3918+07	7.9466+04
24	1.2275+03	1.3420+02	6.2335+00	9.0941-02	1.2573+07	8.1037+04
25	1.2396+03	1.3499+02	5.5610+00	9.1090-02	1.1217+07	8.1169+04
26	1.2175+03	1.3979+02	2.6606+00	8.6830-02	5.3664+06	7.7373+04
27	1.2263+03	1.3636+02	4.8041+00	8.6902-02	9.6899+06	7.7438+04

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	255	258	270	271	272	279
	BOP	VPKO	BIP	DPB-G	TSATKI	QL
1	3.1598+01	3.1899+01	3.5073+01	3.4749+00	1.5795+03	2.0807+00
2	3.0582+01	3.0931+01	3.6589+01	6.0072+00	1.5895+03	2.1543+00
*3	3.0828+01	3.0931+01	3.9564+01	8.7360+00	1.6083+03	2.2536+00
4	3.1013+01	3.0440+01	4.2202+01	1.1189+01	1.6243+03	2.3418+00
5	2.9596+01	2.8933+01	4.3103+01	1.3507+01	1.6294+03	2.4019+00
6	2.9996+01	2.9112+01	4.4466+01	1.4470+01	1.6371+03	2.4608+00
7	2.9657+01	2.8785+01	4.7022+01	1.7365+01	1.6513+03	2.5254+00
8	3.1290+01	2.9723+01	4.8158+01	1.6868+01	1.6572+03	2.5832+00
9	3.0304+01	2.8711+01	4.8414+01	1.8109+01	1.6586+03	2.5898+00
10	3.0243+01	2.8029+01	4.9408+01	1.9165+01	1.6638+03	2.6210+00
11	2.8271+01	2.7321+01	5.1140+01	2.2869+01	1.6728+03	2.6948+00
12	3.1845+01	3.2129+01	3.5859+01	4.0141+00	1.5847+03	2.0984+00
13	3.1229+01	3.1288+01	3.4595+01	3.3667+00	1.5764+03	2.0739+00
14	3.1845+01	3.2199+01	3.5324+01	3.4796+00	1.5812+03	2.0836+00
15	3.4420+01	3.4804+01	3.7514+01	3.0939+00	1.5956+03	2.1232+00
16	2.8240+01	2.8901+01	3.4061+01	5.8208+00	1.5727+03	2.1077+00
17	2.7685+01	2.8082+01	3.6362+01	8.6767+00	1.5880+03	2.2143+00
18	2.5559+01	2.6052+01	3.6474+01	1.0915+01	1.5887+03	2.2619+00
19	1.9562+01	2.5313+01	3.1245+01	1.1683+01	1.5527+03	2.3102+00
20	1.8910+01	2.4787+01	3.3654+01	1.4743+01	1.5698+03	2.3275+00
21	2.3608+01	2.2599+01	3.5828+01	1.2220+01	1.5845+03	2.3062+00
22	2.5528+01	2.5556+01	3.7850+01	1.2321+01	1.5978+03	2.2669+00
23	3.6011+01	3.5944+01	4.1864+01	5.8526+00	1.6223+03	2.3079+00
24	3.0397+01	3.0566+01	3.7485+01	7.0884+00	1.5954+03	2.2291+00
25	2.9503+01	2.9765+01	3.6924+01	7.4208+00	1.5917+03	2.2253+00
26	2.6299+01	2.6247+01	2.7262+01	9.6366-01	1.5219+03	2.2569+00
27	2.9380+01	2.9734+01	3.7120+01	7.7403+00	1.5930+03	2.2436+00

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	284	287	291	703	705	707
	QPRI	DT-SC	QSC	QUAL-B	VFV-B	VVEL-B
1	2.8122+01	1.8921+02	6.7219+00	1.5679-01	4.4519-01	1.1020+02
2	4.5454+01	2.1694+02	7.4983+00	2.8460-01	8.1061-01	2.0065+02
3	5.9761+01	2.3653+02	7.8026+00	4.0949-01	1.1109+00	2.7498+02
4	7.5231+01	2.5658+02	8.3660+00	5.3396-01	1.4497+00	3.5883+02
5	8.7094+01	2.7427+02	9.0326+00	6.1608-01	1.7651+00	4.3690+02
6	9.4823+01	2.8168+02	8.9275+00	7.0359-01	1.9277+00	4.7716+02
7	1.0444+02	3.0227+02	9.8326+00	7.5781-01	2.1491+00	5.3196+02
8	1.0907+02	3.1114+02	9.7356+00	8.2597-01	2.1921+00	5.4260+02
9	1.1260+02	3.0005+02	9.8007+00	8.2120-01	2.3386+00	5.7885+02
10	1.1625+02	3.1588+02	1.0030+01	8.7165-01	2.4642+00	6.0996+02
11	1.2339+02	3.3818+02	1.0148+01	9.8082-01	2.6810+00	6.6361+02
12	2.8821+01	2.1444+02	6.4313+00	1.9354-01	4.6173-01	1.1429+02
13	3.0884+01	2.4940+02	6.1540+00	2.5495-01	5.1655-01	1.2786+02
14	3.0208+01	3.0464+02	6.1869+00	2.9838-01	4.8665-01	1.2046+02
15	2.9570+01	3.3981+02	6.0505+00	3.3290-01	4.4273-01	1.0959+02
16	4.4233+01	3.5777+02	6.2841+00	5.3637-01	8.4029-01	2.0799+02
17	6.7979+01	3.9759+02	6.6424+00	9.0853-01	1.3874+00	3.4341+02
18	7.6304+01	3.9850+02	6.3391+00	1.0854+00	1.6876+00	4.1773+02
19	6.6012+01	3.7103+02	4.9835+00	1.1053+00	1.4977+00	3.7071+02
20	6.8811+01	3.9507+02	5.3103+00	1.1548+00	1.5933+00	3.9438+02
21	8.2901+01	4.1565+02	7.5620+00	1.0194+00	2.0626+00	5.1054+02
22	8.0106+01	3.9748+02	8.0853+00	8.8173-01	1.7803+00	4.4066+02
23	5.9365+01	3.7417+02	6.6592+00	7.4866-01	9.6527-01	2.3893+02
24	6.1542+01	3.6812+02	6.6426+00	7.5954-01	1.1608+00	2.8733+02
25	6.1622+01	3.5250+02	6.3778+00	7.6247-01	1.1938+00	2.9549+02
26	5.7138+01	3.0466+02	5.1954+00	7.3649-01	1.2263+00	3.0353+02
27	6.3260+01	3.6711+02	6.3273+00	8.2294-01	1.2303+00	3.0454+02

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	713	715	717	721	722	724
	VCIT-I	VCIT-I	VCIT-A	VCOT-I	VCOT-I	VCOT-A
1	1.5538+03	1.5531+03	1.5534+03	1.5529+03	1.5534+03	1.5532+03
2	1.5466+03	1.5466+03	1.5466+03	1.5449+03	1.5446+03	1.5448+03
3	1.5461+03	1.5456+03	1.5458+03	1.5415+03	1.5418+03	1.5417+03
4	1.5425+03	1.5427+03	1.5426+03	1.5355+03	1.5353+03	1.5354+03
5	1.5299+03	1.5296+03	1.5297+03	1.5198+03	1.5200+03	1.5199+03
6	1.5307+03	1.5302+03	1.5305+03	1.5193+03	1.5200+03	1.5197+03
7	1.5282+03	1.5274+03	1.5278+03	1.5144+03	1.5157+03	1.5151+03
8	1.5358+03	1.5356+03	1.5357+03	1.5223+03	1.5225+03	1.5224+03
9	1.5269+03	1.5266+03	1.5268+03	1.5119+03	1.5128+03	1.5124+03
10	1.5213+03	1.5207+03	1.5210+03	1.5054+03	1.5062+03	1.5058+03
11	1.5152+03	1.5152+03	1.5152+03	1.4990+03	1.4990+03	1.4990+03
12	1.5554+03	1.5557+03	1.5556+03	1.5552+03	1.5547+03	1.5550+03
13	1.5492+03	1.5485+03	1.5488+03	1.5485+03	1.5493+03	1.5489+03
14	1.5557+03	1.5549+03	1.5553+03	1.9753+03	1.9753+03	1.9753+03
15	1.5740+03	1.5737+03	1.5738+03	1.5738+03	1.5745+03	1.5742+03
16	1.5309+03	1.5312+03	1.5311+03	1.5301+03	1.5294+03	1.5297+03
17	1.5246+03	1.5249+03	1.5248+03	1.5210+03	1.5208+03	1.5209+03
18	1.5065+03	1.5069+03	1.5067+03	1.5010+03	1.5000+03	1.5005+03
19	1.4635+03	1.4640+03	1.4638+03	1.4391+03	1.4404+03	1.4397+03
20	1.4498+03	1.4501+03	1.4499+03	1.4245+03	1.4255+03	1.4250+03
21	1.4778+03	1.4772+03	1.4775+03	1.4682+03	1.4682+03	1.4682+03
22	1.5033+03	1.5031+03	1.5032+03	1.4957+03	1.4955+03	1.4956+03
23	1.5823+03	1.5816+03	1.5819+03	1.5798+03	1.5792+03	1.5795+03
24	1.5446+03	1.5443+03	1.5444+03	1.5412+03	1.5405+03	1.5409+03
25	1.5374+03	1.5373+03	1.5374+03	1.5342+03	1.5342+03	1.5342+03
26	1.5092+03	1.5088+03	1.5090+03	1.5052+03	1.5054+03	1.5053+03
27	1.5374+03	1.5374+03	1.5374+03	1.5340+03	1.5330+03	1.5335+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	727	730	732	733	735	737
	VP VCI	DPVC	HCOT-I	HCOT-I	HCOT-A	HCAIT
1	3.1349+01	3.4576-02	1.5516+03	1.5518+03	1.5517+03	1.3068+02
2	3.0422+01	2.3188-01	1.5423+03	1.5422+03	1.5422+03	1.0437+02
3	3.0327+01	5.3753-01	1.5366+03	1.5378+03	1.5372+03	1.0855+02
4	2.9905+01	9.2751-01	1.5311+03	1.5301+03	1.5306+03	1.0870+02
5	2.8245+01	1.2153+00	1.5126+03	1.5136+03	1.5131+03	9.1476+01
6	2.8341+01	1.3407+00	1.5123+03	1.5123+03	1.5123+03	8.0718+01
7	2.8000+01	1.5461+00	1.5074+03	1.5064+03	1.5069+03	8.2478+01
8	2.9020+01	1.6965+00	1.5154+03	1.5131+03	1.5142+03	8.2038+01
9	2.7861+01	1.7284+00	1.5037+03	1.5021+03	1.5029+03	8.2148+01
10	2.7157+01	1.8027+00	1.9753+03	1.4958+03	1.7356+03	8.1334+01
11	2.6473+01	1.9167+00	1.9753+03	1.4892+03	1.7323+03	7.9552+01
12	3.1649+01	8.0678-02	1.5566+03	1.5534+03	1.5550+03	1.3374+02
13	3.0717+01	-1.0540-02	1.5480+03	1.5482+03	1.5481+03	1.3556+02
14	3.1614+01	-1.1013+02	1.9753+03	1.5549+03	1.7651+03	1.4038+02
15	3.4216+01	-4.5539-02	1.5737+03	1.5740+03	1.5738+03	1.5844+02
16	2.8416+01	1.7071-01	1.9753+03	1.5291+03	1.7522+03	1.1801+02
17	2.7607+01	4.5998-01	1.5218+03	1.5183+03	1.5201+03	1.0355+02
18	2.5462+01	7.3941-01	1.4983+03	1.4978+03	1.4981+03	9.4930+01
19	2.0843+01	2.2916+00	1.3627+03	1.3682+03	1.3654+03	9.1828+01
20	1.9469+01	2.2424+00	1.3592+03	1.3602+03	1.3597+03	9.1190+01
21	2.2223+01	9.4492-01	1.4664+03	1.4645+03	1.4655+03	9.0420+01
22	2.5043+01	8.5404-01	1.4940+03	1.4924+03	1.4932+03	8.9276+01
23	3.5438+01	3.7062-01	1.5780+03	1.5779+03	1.5780+03	9.4314+01
24	3.0148+01	4.6376-01	1.5399+03	1.5391+03	1.5395+03	9.0552+01
25	2.9231+01	4.1106-01	1.5322+03	1.5320+03	1.5321+03	9.3962+01
26	2.5734+01	4.3774-01	1.5026+03	1.5021+03	1.5023+03	1.0670+02
27	2.9241+01	5.0605-01	1.5319+03	1.5320+03	1.5320+03	9.7526+01

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	739	741	746	747	748	749
	HCAIT	HCAITA	HCAOTS	HCAOT-NE	HCAOTN	HCAOTH
1	1.1704+02	1.2386+02	1.2793+03	1.2763+03	1.4348+03	1.2522+03
2	1.0173+02	1.0305+02	1.3730+03	1.3717+03	1.3670+03	1.3591+03
3	1.0723+02	1.0789+02	1.3618+03	1.3622+03	1.3605+03	1.3559+03
4	1.0738+02	1.0804+02	1.3156+03	1.3173+03	1.3236+03	1.3118+03
5	8.9276+01	9.0376+01	1.2570+03	1.2570+03	2.1970+03	1.2469+03
6	7.8958+01	7.9838+01	1.2255+03	1.2234+03	2.1970+03	1.2142+03
7	8.0278+01	8.1378+01	1.1884+03	1.1836+03	1.1832+03	1.1767+03
8	8.0278+01	8.1158+01	1.1783+03	1.1716+03	1.1741+03	1.1662+03
9	7.9508+01	8.0828+01	1.1528+03	1.1461+03	1.1486+03	1.1419+03
10	7.9134+01	8.0234+01	1.1311+03	1.1222+03	1.1277+03	1.1197+03
11	7.8232+01	7.8892+01	1.0992+03	1.0859+03	1.0944+03	1.0871+03
12	1.2450+02	1.2912+02	1.3365+03	1.3351+03	1.3260+03	1.3164+03
13	1.2632+02	1.3094+02	1.3278+03	1.3269+03	1.3177+03	1.3076+03
14	1.3026+02	1.3532+02	1.3295+03	1.3273+03	1.3185+03	1.3071+03
15	1.4260+02	1.5052+02	1.3089+03	1.3054+03	1.2948+03	1.2818+03
16	1.1405+02	1.1603+02	1.3624+03	1.3607+03	1.3561+03	1.3498+03
17	1.0047+02	1.0201+02	1.3174+03	1.3186+03	1.3132+03	1.3128+03
18	9.1850+01	9.3390+01	1.2649+03	1.2670+03	1.2605+03	1.2600+03
19	8.9628+01	9.0728+01	1.1925+03	1.1947+03	1.1894+03	1.1885+03
20	8.8990+01	9.0090+01	1.1741+03	1.1749+03	1.1703+03	1.1690+03
21	8.8220+01	8.9320+01	1.2201+03	1.2201+03	1.2155+03	1.2117+03
22	8.6636+01	8.7956+01	1.2474+03	1.2487+03	1.2434+03	1.2417+03
23	8.9914+01	9.2114+01	1.3975+03	1.3971+03	1.3924+03	1.3898+03
24	8.7472+01	8.9012+01	1.3547+03	1.3543+03	1.3496+03	1.3478+03
25	9.1322+01	9.2642+01	1.3451+03	1.3446+03	1.3402+03	1.3389+03
26	1.0406+02	1.0538+02	1.3179+03	1.3179+03	1.5151+03	1.3128+03
27	9.4446+01	9.5986+01	1.3420+03	1.3416+03	1.3368+03	1.3363+03

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	751	755	756	757	759	766
	HCAOTA	HCCAOT	HCCAOT	HCCAOT	HCCAOA	WA
1	1.3107+03	9.7680+01	9.8120+01	1.0076+02	9.8853+01	2.3475-02
2	1.3677+03	9.8648+01	9.8208+01	9.9968+01	9.8941+01	7.4058-02
3	1.3601+03	1.0591+02	1.0591+02	1.0679+02	1.0620+02	1.2582-01
4	1.3171+03	1.0694+02	1.0694+02	1.0738+02	1.0709+02	1.8086-01
5	1.4895+03	8.9716+01	8.8836+01	8.8836+01	8.9129+01	2.3362-01
6	1.4651+03	7.9838+01	7.8958+01	7.8518+01	7.9105+01	2.7185-01
7	1.1830+03	8.1598+01	8.0278+01	7.9838+01	8.0571+01	3.2030-01
8	1.1726+03	8.1158+01	7.9838+01	8.0278+01	8.0425+01	3.4345-01
9	1.1474+03	8.0828+01	7.9508+01	7.9948+01	8.0095+01	3.6623-01
10	1.1252+03	8.0454+01	7.9134+01	7.9134+01	7.9574+01	3.9063-01
11	1.0916+03	7.9992+01	7.8232+01	7.7792+01	7.8672+01	4.4757-01
12	1.3285+03	1.1482+02	1.1350+02	1.1614+02	1.1482+02	3.8111-02
13	1.3200+03	1.1664+02	1.1532+02	1.1796+02	1.1664+02	3.6430-02
14	1.3206+03	1.2014+02	1.1838+02	1.2146+02	1.2000+02	3.4578-02
15	1.2977+03	1.2456+02	1.2280+02	1.2588+02	1.2442+02	2.4198-02
16	1.3573+03	1.1141+02	1.1053+02	1.1097+02	1.1097+02	7.9827-02
17	1.3155+03	1.0003+02	9.9154+01	9.9154+01	9.9447+01	1.6027-01
18	1.2631+03	9.1850+01	9.0970+01	9.1410+01	9.1410+01	1.9789-01
19	1.1913+03	9.0508+01	8.9188+01	8.9188+01	8.9628+01	0.
20	1.1721+03	9.0310+01	8.8550+01	8.8110+01	8.8990+01	0.
21	1.2169+03	8.9100+01	8.7780+01	8.7340+01	8.8073+01	0.
22	1.2453+03	8.7516+01	8.6196+01	8.6196+01	8.6636+01	0.
23	1.3942+03	8.9034+01	8.8154+01	8.7714+01	8.8301+01	1.1794-01
24	1.3516+03	8.7032+01	8.5712+01	8.5272+01	8.6005+01	1.2956-01
25	1.3422+03	9.0442+01	8.9122+01	8.9562+01	8.9709+01	1.3578-01
26	1.3659+03	1.0406+02	1.0318+02	1.0318+02	1.0347+02	1.4308-01
27	1.3392+03	9.4446+01	9.3126+01	9.3566+01	9.3713+01	1.4308-01

300 KW BOILING DATA, 1-IN.L-605 TUBE W/2-IN. HELICAL INSERT

	770	777	779
	QA	DTLMHC	UOHC
1	7.0926+00	6.6759+02	5.3316+00
2	2.3897+01	6.0018+02	1.9981+01
3	4.0192+01	6.0087+02	3.3568+01
4	5.5645+01	6.3890+02	4.3707+01
5	8.3912+01	3.4257+02	1.2292+02
6	9.6496+01	4.0750+02	1.1884+02
7	8.8997+01	7.4603+02	5.9866+01
8	9.4490+01	7.6390+02	6.2075+01
9	9.8315+01	7.7251+02	6.3868+01
10	1.0261+02	9.6104+02	5.3580+01
11	1.1371+02	9.7919+02	5.8276+01
12	1.1651+01	6.5190+02	8.9692+00
13	1.1037+01	6.5121+02	8.5056+00
14	1.0445+01	9.8234+02	5.3362+00
15	7.0707+00	6.9963+02	5.0718+00
16	2.5282+01	7.9887+02	1.5882+01
17	4.9474+01	6.2702+02	3.9597+01
18	5.8684+01	6.5487+02	4.4971+01
19	0.	5.7389+02	0.
20	0.	5.8472+02	0.
21	0.	6.5976+02	0.
22	0.	6.6783+02	0.
23	3.9220+01	6.2343+02	3.1570+01
24	4.1672+01	6.1814+02	3.3831+01
25	4.3207+01	6.1750+02	3.5114+01
26	4.6020+01	5.4266+02	4.2559+01
27	4.5297+01	6.1954+02	3.6691+01

TABLE A-3

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	202	203	860	861	862	863
	DATE	TIME	PIT-I	POT-I	PIT-I	PIT-I
1	5.1240+00	2.1000+03	8.7256+02	8.6886+02	8.7153+02	8.7203+02
2	5.1240+00	2.2150+03	8.5610+02	8.5166+02	8.5488+02	8.5520+02
3	5.1240+00	2.3450+03	8.6239+02	8.5315+02	8.6061+02	8.6094+02
4	5.1340+00	5.9000+01	8.6147+02	8.4214+02	8.6061+02	8.6038+02
5	5.1340+00	2.0800+02	8.7275+02	8.3336+02	8.7208+02	8.7185+02
6	5.1340+00	3.0000+02	8.9760+02	8.2814+02	8.9676+02	8.9707+02
7	5.1340+00	1.0300+03	9.2997+02	8.4568+02	9.2933+02	9.2945+02
8	5.1340+00	1.2300+03	9.0127+02	8.9204+02	9.0062+02	9.0112+02
9	5.1340+00	1.3300+03	9.0127+02	8.9149+02	9.0044+02	9.0112+02
10	5.1340+00	1.5300+03	9.0863+02	8.9884+02	9.0798+02	9.0811+02
11	5.1340+00	1.9300+03	9.1820+02	9.0784+02	9.1718+02	9.1749+02
12	5.1340+00	2.2150+03	9.2537+02	9.1831+02	9.2473+02	9.2467+02
13	5.1440+00	5.3500+02	1.2710+03	1.2362+03	1.2700+03	1.2702+03
14	5.1440+00	1.0000+03	9.8436+02	9.7493+02	9.8393+02	9.8422+02
15	5.1440+00	1.2450+03	9.8072+02	9.7838+02	9.7993+02	9.7967+02
16	5.1440+00	2.1300+03	1.5112+03	1.4804+03	1.5104+03	1.5100+03
17	5.1540+00	7.3500+02	1.4824+03	1.4741+03	1.4815+03	1.4810+03
18	5.1540+00	1.0000+03	1.4691+03	1.4648+03	1.4684+03	1.4680+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	864	800	801	802	804	805
	PCT-I	BW 91	BW 91	BW 91	BW 91	BW91-A
1	8.6932+02	8.6133+02	8.6257+02	8.6043+02	8.6593+02	8.6257+02
2	8.5192+02	8.4478+02	8.4473+02	8.4352+02	8.4864+02	8.4542+02
3	8.5398+02	8.4816+02	8.4793+02	8.4745+02	8.5118+02	8.4868+02
4	8.4240+02	8.3989+02	8.3947+02	8.3919+02	8.4360+02	8.4054+02
5	8.3343+02	8.3424+02	8.3363+02	8.3334+02	8.3775+02	8.3474+02
6	8.2839+02	8.3032+02	8.2878+02	8.3015+02	8.3254+02	8.3045+02
7	8.4576+02	8.5037+02	8.4921+02	8.4812+02	8.5340+02	8.5028+02
8	8.9195+02	8.8699+02	8.8750+02	8.8531+02	8.9034+02	8.8754+02
9	8.9159+02	8.8728+02	8.8668+02	8.8707+02	8.9163+02	8.8817+02
10	8.9949+02	8.9600+02	8.9613+02	8.9468+02	9.0008+02	8.9672+02
11	9.0831+02	9.0705+02	9.0791+02	9.0608+02	9.1132+02	9.0809+02
12	9.1878+02	9.1446+02	9.1496+02	9.1366+02	9.1871+02	9.1545+02
13	1.2368+03	1.2426+03	1.2408+03	1.2410+03	1.2433+03	1.2419+03
14	9.7451+02	9.7223+02	9.7237+02	9.7155+02	9.7623+02	9.7310+02
15	9.7906+02	9.7054+02	9.7049+02	9.7022+02	9.7349+02	9.7119+02
16	1.4807+03	1.4875+03	1.4866+03	1.4834+03	1.4888+03	1.4866+03
17	1.4744+03	1.4729+03	1.4729+03	1.4724+03	1.4742+03	1.4731+03
18	1.4649+03	1.4624+03	1.4614+03	1.4609+03	1.4629+03	1.4619+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	806	807	808	809	810	811
	BW 84	BW 84	BW 84	BW 84	BW84-A	BW 77
1	8.6074+02	8.6371+02	8.6469+02	8.6423+02	8.6334+02	8.6182+02
2	8.4434+02	8.4602+02	8.4656+02	8.4699+02	8.4598+02	8.4564+02
3	8.4773+02	8.4960+02	8.4979+02	8.5079+02	8.4948+02	8.4958+02
4	8.3964+02	8.4169+02	8.4056+02	8.4397+02	8.4147+02	8.4187+02
5	8.3510+02	8.3586+02	8.3493+02	8.4038+02	8.3657+02	8.3770+02
6	8.3176+02	8.3086+02	8.3016+02	8.3565+02	8.3211+02	8.3452+02
7	8.5224+02	8.5173+02	8.5151+02	8.5777+02	8.5331+02	8.5568+02
8	8.8589+02	8.8927+02	8.8906+02	8.8940+02	8.8841+02	8.8766+02
9	8.8692+02	8.8845+02	8.8824+02	8.9005+02	8.8841+02	8.8869+02
10	8.9528+02	8.9790+02	8.9736+02	8.9953+02	8.9752+02	8.9684+02
11	9.0635+02	9.0916+02	9.0957+02	9.0938+02	9.0861+02	9.0715+02
12	9.1377+02	9.1531+02	9.1612+02	9.1613+02	9.1533+02	9.1493+02
13	1.2420+03	1.2444+03	1.2431+03	1.2460+03	1.2439+03	1.2468+03
14	9.7239+02	9.7339+02	9.7388+02	9.7419+02	9.7346+02	9.7378+02
15	9.6997+02	9.7134+02	9.7218+02	9.7231+02	9.7145+02	9.7100+02
16	1.4894+03	1.4899+03	1.4867+03	1.4870+03	1.4882+03	1.4928+03
17	1.4736+03	1.4735+03	1.4735+03	1.4733+03	1.4735+03	1.4741+03
18	1.4629+03	1.4618+03	1.4623+03	1.4622+03	1.4623+03	1.4624+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	812	813	814	815	816	817
	BW 77	BW 77	BW 77	BW77-A	BW 70	BW 70
1	8.6273+02	8.6106+02	8.6290+02	8.6213+02	8.6201+02	8.6191+02
2	8.4522+02	8.4560+02	8.4563+02	8.4552+02	8.4513+02	8.4501+02
3	8.4954+02	8.4936+02	8.4959+02	8.4952+02	8.4943+02	8.4932+02
4	8.4238+02	8.4108+02	8.4293+02	8.4207+02	8.4378+02	8.4422+02
5	8.3971+02	8.3655+02	8.3987+02	8.3846+02	8.4184+02	8.4116+02
6	8.3824+02	8.3413+02	8.3722+02	8.3603+02	8.4123+02	8.4020+02
7	8.5997+02	8.5460+02	8.6025+02	8.5763+02	8.6281+02	8.6147+02
8	8.8865+02	8.8713+02	8.8845+02	8.8797+02	8.8872+02	8.8867+02
9	8.8782+02	8.8797+02	8.8876+02	8.8831+02	8.9086+02	8.9043+02
10	8.9655+02	8.9632+02	8.9889+02	8.9715+02	8.9805+02	8.9801+02
11	9.0817+02	9.0684+02	9.0842+02	9.0764+02	9.0762+02	9.0759+02
12	9.1395+02	9.1444+02	9.1527+02	9.1465+02	9.1446+02	9.1389+02
13	1.2480+03	1.2451+03	1.2462+03	1.2465+03	1.2486+03	1.2484+03
14	9.7242+02	9.7265+02	9.7367+02	9.7313+02	9.7372+02	9.7344+02
15	9.7000+02	9.7096+02	9.7109+02	9.7076+02	9.7167+02	9.7121+02
16	1.4905+03	1.4890+03	1.4892+03	1.4904+03	1.4918+03	1.4931+03
17	1.4731+03	1.4731+03	1.4734+03	1.4734+03	1.4746+03	1.4745+03
18	1.4617+03	1.4617+03	1.4619+03	1.4619+03	1.4623+03	1.4616+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	818	819	820	821	822	823
	BW 70	BW 70	BW70-A	BW 63	BW 63	BW 63
1	8.6405+02	8.6301+02	8.6275+02	8.6422+02	8.6316+02	8.6407+02
2	8.4678+02	8.4578+02	8.4567+02	8.4925+02	8.4587+02	8.4759+02
3	8.5128+02	8.5013+02	8.5004+02	8.5336+02	8.5056+02	8.5231+02
4	8.4488+02	8.4498+02	8.4446+02	8.4716+02	8.4564+02	8.4754+02
5	8.4238+02	8.4307+02	8.4211+02	8.4651+02	8.4501+02	8.4749+02
6	8.4237+02	8.4167+02	8.4137+02	8.4812+02	8.4481+02	8.5037+02
7	8.6510+02	8.6518+02	8.6364+02	8.7069+02	8.6901+02	8.7303+02
8	8.9010+02	8.8889+02	8.8909+02	8.9237+02	8.8977+02	8.9161+02
9	8.8946+02	8.8973+02	8.9012+02	8.9211+02	8.9006+02	8.9336+02
10	8.9815+02	8.9921+02	8.9836+02	9.0020+02	8.9930+02	9.0044+02
11	9.0938+02	9.0832+02	9.0823+02	9.1011+02	9.0852+02	9.0972+02
12	9.1569+02	9.1452+02	9.1464+02	9.1748+02	9.1484+02	9.1647+02
13	1.2500+03	1.2491+03	1.2490+03	1.2520+03	1.2507+03	1.2527+03
14	9.7343+02	9.7511+02	9.7392+02	9.7515+02	9.7391+02	9.7555+02
15	9.7101+02	9.7070+02	9.7114+02	9.7256+02	9.6968+02	9.7349+02
16	1.4926+03	1.4936+03	1.4928+03	1.4939+03	1.4945+03	1.4940+03
17	1.4732+03	1.4737+03	1.4740+03	1.4732+03	1.4732+03	1.4750+03
18	1.4612+03	1.4616+03	1.4617+03	1.4609+03	1.4605+03	1.4627+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	824	825	826	827	828	829
	BW63-A	BW 58	BW 58	BW 58	BW 58	BW 58
1	8.6382+02	8.6251+02	8.6324+02	8.6165+02	8.6388+02	8.6597+02
2	8.4757+02	8.4570+02	8.4587+02	8.4624+02	8.4663+02	8.4943+02
3	8.5208+02	8.5055+02	8.5034+02	8.4999+02	8.5131+02	8.5476+02
4	8.4678+02	8.4659+02	8.4657+02	8.4545+02	8.4769+02	8.5016+02
5	8.4634+02	8.4760+02	8.4759+02	8.4649+02	8.4873+02	8.5137+02
6	8.4777+02	8.5049+02	8.4992+02	8.4868+02	8.5001+02	8.5397+02
7	8.7091+02	8.7557+02	8.7446+02	8.7297+02	8.7522+02	8.7850+02
8	8.9125+02	8.8950+02	8.8987+02	8.9024+02	8.9064+02	8.9405+02
9	8.9184+02	8.9016+02	8.8961+02	8.8960+02	8.9019+02	8.9368+02
10	8.9998+02	8.9898+02	8.9771+02	8.9663+02	8.9832+02	9.0286+02
11	9.0945+02	9.0796+02	9.0798+02	9.0694+02	9.0881+02	9.1209+02
12	9.1626+02	9.1477+02	9.1552+02	9.1342+02	9.1493+02	9.1892+02
13	1.2518+03	1.2523+03	1.2509+03	1.2514+03	1.2537+03	1.2555+03
14	9.7487+02	9.7383+02	9.7405+02	9.7241+02	9.7481+02	9.7752+02
15	9.7191+02	9.6997+02	9.6983+02	9.6890+02	9.6968+02	9.7423+02
16	1.4941+03	1.4950+03	1.4945+03	1.4961+03	1.4966+03	1.4975+03
17	1.4738+03	1.4728+03	1.4724+03	1.4719+03	1.4725+03	1.4746+03
18	1.4614+03	1.4604+03	1.4602+03	1.4593+03	1.4603+03	1.4615+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	830	831	832	833	834	835
	BW 58	BW58-A	BW 50	BW 50	BW 50	BW 50
1	8.6416+02	8.6357+02	8.6325+02	8.6433+02	8.6454+02	8.6523+02
2	8.4745+02	8.4689+02	8.4638+02	8.4895+02	8.4821+02	8.4891+02
3	8.5245+02	8.5157+02	8.5164+02	8.5363+02	8.5348+02	8.5418+02
4	8.4744+02	8.4731+02	8.4834+02	8.4983+02	8.4942+02	8.4993+02
5	8.4886+02	8.4844+02	8.5085+02	8.5347+02	8.5213+02	8.5171+02
6	8.5288+02	8.5099+02	8.5744+02	8.5952+02	8.5837+02	8.5648+02
7	8.7690+02	8.7560+02	8.8268+02	8.8656+02	8.8403+02	8.8178+02
8	8.9192+02	8.9104+02	8.9078+02	8.9400+02	8.9231+02	8.9300+02
9	8.9210+02	8.9089+02	8.9035+02	8.9263+02	8.9280+02	8.9386+02
10	9.0043+02	8.9915+02	8.9881+02	9.0019+02	9.0071+02	9.0104+02
11	9.0974+02	9.0892+02	9.0868+02	9.0994+02	9.1004+02	9.1056+02
12	9.1610+02	9.1561+02	9.1533+02	9.1660+02	9.1690+02	9.1742+02
13	1.2543+03	1.2530+03	1.2541+03	1.2568+03	1.2554+03	1.2567+03
14	9.7545+02	9.7468+02	9.7452+02	9.7494+02	9.7580+02	9.7650+02
15	9.7179+02	9.7073+02	9.7068+02	9.7199+02	9.7232+02	9.7284+02
16	1.4966+03	1.4960+03	1.4968+03	1.4994+03	1.4969+03	1.4976+03
17	1.4740+03	1.4730+03	1.4741+03	1.4737+03	1.4739+03	1.4742+03
18	1.4619+03	1.4606+03	1.4614+03	1.4609+03	1.4614+03	1.4617+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	836	837	838	839	840	841
	BW 50	BW50-A	BW 43	BW 43	BW 43	BW 43
1	8.6430+02	8.6433+02	8.6449+02	8.6495+02	8.6403+02	8.6423+02
2	8.4794+02	8.4808+02	8.4827+02	8.4863+02	8.4749+02	8.4805+02
3	8.5284+02	8.5315+02	8.5351+02	8.5390+02	8.5277+02	8.5351+02
4	8.4951+02	8.4941+02	8.4948+02	8.5170+02	8.4981+02	8.5037+02
5	8.5260+02	8.5215+02	8.5199+02	8.5717+02	8.5383+02	8.5513+02
6	8.5794+02	8.5795+02	8.5869+02	8.6742+02	8.6227+02	8.6357+02
7	8.8403+02	8.8381+02	8.8493+02	8.9550+02	8.8910+02	8.9135+02
8	8.9249+02	8.9251+02	8.9245+02	8.9344+02	8.9220+02	8.9241+02
9	8.9225+02	8.9238+02	8.9295+02	8.9320+02	8.9178+02	8.9291+02
10	8.9980+02	9.0011+02	9.0080+02	9.0056+02	8.9988+02	9.0009+02
11	9.0971+02	9.0979+02	9.1027+02	9.0989+02	9.0959+02	9.0945+02
12	9.1658+02	9.1657+02	9.1725+02	9.1638+02	9.1646+02	9.1596+02
13	1.2554+03	1.2557+03	1.2562+03	1.2578+03	1.2560+03	1.2569+03
14	9.7543+02	9.7544+02	9.7559+02	9.7545+02	9.7473+02	9.7535+02
15	9.7140+02	9.7185+02	9.7211+02	9.7143+02	9.7142+02	9.7150+02
16	1.4979+03	1.4977+03	1.4971+03	1.4994+03	1.4983+03	1.4990+03
17	1.4733+03	1.4738+03	1.4734+03	1.4734+03	1.4736+03	1.4736+03
18	1.4607+03	1.4612+03	1.4610+03	1.4607+03	1.4613+03	1.4609+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	842	843	844	845	846	847
	BW43-A	BW 36	BW 36	BW 36	BW 36	BW36-A
1	8.6442+02	8.6451+02	8.6359+02	8.6462+02	8.6277+02	8.6387+02
2	8.4811+02	8.4830+02	8.4731+02	8.4829+02	8.4632+02	8.4755+02
3	8.5342+02	8.5335+02	8.5312+02	8.5393+02	8.5217+02	8.5314+02
4	8.5034+02	8.5118+02	8.5094+02	8.5154+02	8.5050+02	8.5104+02
5	8.5453+02	8.5572+02	8.5862+02	8.5831+02	8.5619+02	8.5721+02
6	8.6299+02	8.6423+02	8.7343+02	8.7059+02	8.6965+02	8.6948+02
7	8.9022+02	8.9178+02	9.0286+02	9.0067+02	8.9806+02	8.9834+02
8	8.9263+02	8.9283+02	8.9238+02	8.9294+02	8.9125+02	8.9235+02
9	8.9271+02	8.9204+02	8.9270+02	8.9325+02	8.9175+02	8.9244+02
10	9.0033+02	9.0026+02	8.9966+02	9.0079+02	8.9879+02	8.9988+02
11	9.0980+02	9.0990+02	9.0897+02	9.1032+02	9.0800+02	9.0930+02
12	9.1651+02	9.1652+02	9.1562+02	9.1717+02	9.1454+02	9.1596+02
13	1.2567+03	1.2579+03	1.2584+03	1.2591+03	1.2570+03	1.2581+03
14	9.7528+02	9.7503+02	9.7472+02	9.7555+02	9.7386+02	9.7479+02
15	9.7162+02	9.7137+02	9.7070+02	9.7188+02	9.6983+02	9.7095+02
16	1.4984+03	1.4991+03	1.5000+03	1.5001+03	1.4996+03	1.4997+03
17	1.4735+03	1.4731+03	1.4732+03	1.4732+03	1.4736+03	1.4733+03
18	1.4610+03	1.4607+03	1.4602+03	1.4608+03	1.4610+03	1.4607+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	848	849	850	851	852	853
	BW 29	BW 29	BW 29	BW29-A	BW 23	BW 23
1	8.6486+02	8.6405+02	8.6244+02	8.6378+02	8.6302+02	8.6875+02
2	8.4854+02	8.4770+02	8.4620+02	8.4748+02	8.4691+02	8.5209+02
3	8.5400+02	8.5390+02	8.5167+02	8.5319+02	8.5217+02	8.5757+02
4	8.5254+02	8.5244+02	8.4945+02	8.5148+02	8.5110+02	8.5689+02
5	8.6058+02	8.6049+02	8.5515+02	8.5874+02	8.6080+02	8.6508+02
6	8.7618+02	8.7907+02	8.6804+02	8.7443+02	8.7989+02	8.8202+02
7	9.0657+02	9.0945+02	8.9715+02	9.0439+02	9.1053+02	9.1300+02
8	8.9317+02	8.9276+02	8.9126+02	8.9239+02	8.9236+02	8.9729+02
9	8.9293+02	8.9307+02	8.9157+02	8.9252+02	8.9158+02	8.9747+02
10	9.0065+02	9.0043+02	8.9841+02	8.9983+02	8.9891+02	9.0498+02
11	9.1017+02	9.0960+02	9.0762+02	9.0913+02	9.0823+02	9.1418+02
12	9.1647+02	9.1609+02	9.1470+02	9.1575+02	9.1488+02	9.2098+02
13	1.2599+03	1.2596+03	1.2572+03	1.2589+03	1.2593+03	1.2638+03
14	9.7555+02	9.7543+02	9.7357+02	9.7485+02	9.7384+02	9.7991+02
15	9.7134+02	9.7123+02	9.6973+02	9.7077+02	9.7018+02	9.7591+02
16	1.5005+03	1.5011+03	1.5002+03	1.5006+03	1.5017+03	1.5036+03
17	1.4738+03	1.4738+03	1.4736+03	1.4737+03	1.4734+03	1.4761+03
18	1.4616+03	1.4614+03	1.4604+03	1.4612+03	1.4604+03	1.4633+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	855	856	857	858	859	866
	BW 23	BW 23	BW 23	BW 23	BW-23A	SIT-I
1	8.6305+02	8.6474+02	8.6235+02	8.6414+02	8.6434+02	8.1787+02
2	8.4654+02	8.4816+02	8.4596+02	8.4789+02	8.4793+02	8.0441+02
3	8.5273+02	8.5312+02	8.5180+02	8.5375+02	8.5352+02	8.0347+02
4	8.5072+02	8.5261+02	8.4996+02	8.5301+02	8.5238+02	8.0366+02
5	8.5878+02	8.6211+02	8.5822+02	8.6088+02	8.6098+02	8.0516+02
6	8.7640+02	8.8205+02	8.7680+02	8.8082+02	8.7966+02	8.0946+02
7	9.0787+02	9.1259+02	9.0598+02	9.1078+02	9.1012+02	8.2308+02
8	8.9172+02	8.9304+02	8.9148+02	8.9336+02	8.9321+02	8.3201+02
9	8.9221+02	8.9340+02	8.9161+02	8.9221+02	8.9308+02	8.1077+02
10	8.9938+02	9.0040+02	8.9862+02	9.0016+02	9.0041+02	7.5368+02
11	9.0871+02	9.1001+02	9.0762+02	9.0955+02	9.0972+02	6.0849+02
12	9.1520+02	9.1594+02	9.1450+02	9.1591+02	9.1623+02	6.2214+02
13	1.2591+03	1.2614+03	1.2582+03	1.2599+03	1.2603+03	1.1405+03
14	9.7446+02	9.7560+02	9.7360+02	9.7521+02	9.7544+02	6.3783+02
15	9.7062+02	9.7105+02	9.6957+02	9.7136+02	9.7145+02	7.9335+02
16	1.5010+03	1.5026+03	1.5005+03	1.5019+03	1.5019+03	1.3924+03
17	1.4733+03	1.4743+03	1.4730+03	1.4745+03	1.4741+03	1.2873+03
18	1.4608+03	1.4619+03	1.4602+03	1.4619+03	1.4614+03	1.1458+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	867	868	869	870	871	872
	SIT-I	SOT-I	SOT-I	BI 13	BI 21	BI 35
1	8.1880+02	8.6719+02	8.6696+02	8.6775+02	8.6558+02	8.6121+02
2	8.0516+02	8.5041+02	8.5054+02	8.4931+02	8.4891+02	8.4494+02
3	8.0404+02	8.5468+02	8.5482+02	8.5489+02	8.5208+02	8.4728+02
4	8.0366+02	8.4911+02	8.4979+02	8.4887+02	8.4529+02	8.3973+02
5	8.0516+02	8.5078+02	8.5110+02	8.5168+02	8.4609+02	8.3854+02
6	8.1021+02	8.5892+02	8.5887+02	8.5887+02	8.4939+02	8.3945+02
7	8.2382+02	8.8307+02	8.8340+02	8.8390+02	8.7240+02	8.5845+02
8	8.3275+02	8.9268+02	8.9282+02	8.9289+02	8.8995+02	8.8406+02
9	8.1133+02	8.9487+02	8.9484+02	8.9581+02	8.9331+02	8.8700+02
10	7.5387+02	9.0494+02	9.0545+02	9.0711+02	9.0586+02	9.0294+02
11	6.0868+02	9.1244+02	9.1259+02	9.1829+02	9.1829+02	9.1704+02
12	6.2311+02	9.1646+02	9.1680+02	9.2540+02	9.2498+02	9.2457+02
13	1.1407+03	1.2444+03	1.2447+03	1.2466+03	1.2382+03	1.2260+03
14	6.3841+02	9.7959+02	9.7958+02	9.8069+02	9.7861+02	9.7277+02
15	7.9297+02	9.7018+02	9.7107+02	9.7940+02	9.7940+02	9.7940+02
16	1.3924+03	1.4881+03	1.4890+03	1.4874+03	1.4817+03	1.4721+03
17	1.2871+03	1.4490+03	1.4490+03	1.4776+03	1.4763+03	1.4728+03
18	1.1460+03	1.3954+03	1.3952+03	1.4646+03	1.4646+03	1.4637+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	873	874	875	876	211	213
	BI 49	BI 63	BI 77	BI 91	BB	BB
1	8.5596+02	8.4833+02	8.3999+02	8.2686+02	8.2372+02	8.2240+02
2	8.4057+02	8.3274+02	8.2444+02	8.1184+02	8.1072+02	8.1030+02
3	8.4172+02	8.3313+02	8.2264+02	8.1179+02	8.1152+02	8.1026+02
4	8.3444+02	8.2483+02	8.1740+02	8.0720+02	8.0858+02	8.0858+02
5	8.3095+02	8.2177+02	8.1784+02	8.1740+02	8.0984+02	8.0984+02
6	8.3108+02	8.2146+02	8.1972+02	8.1972+02	8.1290+02	8.1416+02
7	8.4901+02	8.3828+02	8.3110+02	8.2323+02	8.2667+02	8.2755+02
8	8.7694+02	8.6562+02	8.5601+02	8.4122+02	8.3828+02	8.3652+02
9	8.8031+02	8.6693+02	8.5239+02	8.2822+02	8.1729+02	8.1435+02
10	8.9669+02	8.8244+02	8.5911+02	8.0839+02	7.6421+02	7.5893+02
11	9.1454+02	9.0786+02	8.8486+02	7.8909+02	6.3155+02	6.2072+02
12	9.2248+02	9.2290+02	9.1498+02	8.5196+02	6.5846+02	6.4966+02
13	1.2135+03	1.1942+03	1.1777+03	1.1553+03	1.1447+03	1.1380+03
14	9.6151+02	9.3141+02	8.7962+02	7.6432+02	6.6040+02	6.4940+02
15	9.7815+02	9.7732+02	9.7523+02	9.4896+02	8.1026+02	8.0102+02
16	1.4603+03	1.4414+03	1.4257+03	1.4056+03	1.3939+03	1.3834+03
17	1.4658+03	1.4487+03	1.4207+03	1.3606+03	1.3003+03	1.2854+03
18	1.4628+03	1.4619+03	1.4554+03	1.3955+03	1.1734+03	1.1503+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	215	222	225	228	230	233
	BB	PIT-A	POT-A	SIT-A	SCT-A	PFMST
1	8.2328+02	8.7204+02	8.6909+02	8.1834+02	8.6708+02	8.6440+02
2	8.1030+02	8.5539+02	8.5179+02	8.0478+02	8.5047+02	8.4876+02
3	8.0984+02	8.6131+02	8.5356+02	8.0376+02	8.5475+02	8.4992+02
4	8.0858+02	8.6082+02	8.4227+02	8.0366+02	8.4945+02	8.3795+02
5	8.1026+02	8.7223+02	8.3340+02	8.0516+02	8.5094+02	8.2915+02
6	8.1542+02	8.9714+02	8.2826+02	8.0983+02	8.5889+02	8.2356+02
7	8.2843+02	9.2958+02	8.4572+02	8.2345+02	8.8323+02	8.4163+02
8	8.3696+02	9.0101+02	8.9200+02	8.3238+02	8.9275+02	8.8675+02
9	8.1477+02	9.0094+02	8.9154+02	8.1105+02	8.9485+02	8.8633+02
10	7.5893+02	9.0824+02	8.9916+02	7.5377+02	9.0519+02	8.9435+02
11	6.1544+02	9.1762+02	9.0807+02	6.0859+02	9.1251+02	9.0351+02
12	6.3451+02	9.2492+02	9.1854+02	6.2263+02	9.1663+02	9.1529+02
13	1.1426+03	1.2704+03	1.2365+03	1.1406+03	1.2445+03	1.2310+03
14	6.4476+02	9.8417+02	9.7472+02	6.3812+02	9.7958+02	9.6712+02
15	7.9808+02	9.8011+02	9.7872+02	7.9316+02	9.7063+02	9.7212+02
16	1.3926+03	1.5105+03	1.4806+03	1.3924+03	1.4886+03	1.4765+03
17	1.2889+03	1.4817+03	1.4742+03	1.2872+03	1.4490+03	1.4715+03
18	1.1453+03	1.4685+03	1.4648+03	1.1459+03	1.3953+03	1.4597+03

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	235	237	239	243	247	249
	PFMMT	SFMST	SFMMT	PFLO	SFLO	G-NA
1	1.3836+02	8.1787+02	1.0888+02	1.8009+01	1.9381+00	3.6325+07
2	1.3680+02	8.0441+02	1.0688+02	1.3498+01	1.9474+00	2.7225+07
3	1.3543+02	8.0347+02	1.0463+02	7.4339+00	1.9489+00	1.4994+07
4	1.3323+02	8.0366+02	1.0287+02	2.9738+00	1.9350+00	5.9982+06
5	1.3235+02	8.0516+02	1.0243+02	1.4807+00	1.9507+00	2.9866+06
6	1.3028+02	8.0946+02	1.0124+02	9.0377-01	1.9433+00	1.8229+06
7	1.2679+02	8.2308+02	9.7746+01	8.9875-01	1.9136+00	1.8128+06
8	1.2916+02	8.3201+02	9.7922+01	7.4894+00	1.9265+00	1.5106+07
9	1.2916+02	8.1077+02	9.8362+01	7.4305+00	1.3696+00	1.4987+07
10	1.2965+02	7.5368+02	9.6646+01	7.4820+00	7.7079-01	1.5091+07
11	1.2780+02	6.0849+02	9.0838+01	7.4719+00	3.8713-01	1.5071+07
12	1.2474+02	6.2214+02	8.7340+01	7.4813+00	2.3473-01	1.5090+07
13	1.4540+02	1.1405+03	1.0008+02	4.2028+00	2.1689+00	8.4771+06
14	1.2624+02	6.3783+02	8.5756+01	1.7466+01	8.3288-01	3.5230+07
15	1.3367+02	7.9335+02	9.9352+01	1.7459+01	1.9310-01	3.5214+07
16	1.7376+02	1.3924+03	1.1961+02	4.1753+00	1.9648+00	8.4216+06
17	1.6731+02	1.2873+03	1.0582+02	1.5384+01	8.4334-01	3.1029+07
18	1.7409+02	1.1458+03	1.1161+02	1.5151+01	2.1764-01	3.0560+07

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	251	255	258	270	271	272
	G-K	BOP	VPKO	BIP	DPB-G	TSATKI*
1	1.7270+06	3.5788+01	3.2819-01	4.9969+01	1.4181+01	
2	1.7353+06	3.5816+01	2.6967-01	5.0593+01	1.4778+01	
3	1.7366+06	3.5760+01	2.8474-01	4.9798+01	1.4038+01	
4	1.7243+06	3.5593+01	2.6676-01	4.9969+01	1.4376+01	
5	1.7382+06	3.5537+01	2.7131-01	4.9741+01	1.4205+01	
6	1.7317+06	3.5425+01	2.9933-01	4.9372+01	1.3947+01	
7	1.7052+06	3.4587+01	3.8512-01	4.8719+01	1.4132+01	
8	1.7167+06	3.4643+01	4.1865-01	4.8748+01	1.4105+01	
9	1.2204+06	3.2985+01	4.2606-01	4.2673+01	9.6877+00	
10	6.8684+05	3.2030+01	4.7180-01	3.8209+01	6.1792+00	
11	3.4497+05	3.0335+01	5.1070-01	3.5513+01	5.1775+00	
12	2.0916+05	3.0366+01	5.3258-01	3.5429+01	5.0626+00	
13	1.9327+06	3.4308+01	6.3815+00	5.1563+01	1.7255+01	
14	7.4217+05	2.7901+01	9.3948-01	3.5148+01	7.2471+00	
15	1.7207+05	2.8240+01	8.6995-01	3.3765+01	5.5252+00	
16	1.7508+06	4.4110+01	2.3425+01	5.9280+01	1.5171+01	
17	7.5149+05	3.9530+01	1.9384+01	4.6169+01	6.6390+00	
18	1.9394+05	3.9000+01	1.4845+01	4.3895+01	4.8958+00	

*This parameter is appropriate only to the boiling runs and has been deleted from the liquid-liquid tabulation.

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	279	284	287	291	703	705
	QL	QPRI	DT-SC*	QSC*	QUAL-B*	VFV-B*
1	4.8079-01	1.5609+01				
2	4.5869-01	1.4290+01				
3	4.6420-01	1.6994+01				
4	4.5802-01	1.6267+01				
5	4.6235-01	1.6962+01				
6	4.7920-01	1.8371+01				
7	5.1507-01	2.2267+01				
8	5.1571-01	1.9372+01				
9	5.1640-01	2.0607+01				
10	5.2672-01	1.9995+01				
11	5.3966-01	2.1012+01				
12	5.5188-01	1.3850+01				
13	1.1598+00	4.1665+01				
14	6.3890-01	4.9052+01				
15	6.3759-01	6.6605+00				
16	1.7690+00	3.6231+01				
17	1.7131+00	3.2943+01				
18	1.5808+00	1.5119+01				

*These parameters are appropriate only to the boiling runs and have been deleted from the liquid-liquid tabulation.

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	707	713	715	717	720	721
	VVEL-B*	VCIT-I	VCIT-I	VCIT-A	VCOT-I	VCOT-I
1		8.6243+02	8.6280+02	8.6261+02	8.5544+02	8.6022+02
2		8.4559+02	8.4466+02	8.4512+02	8.4038+02	8.4354+02
3		8.4931+02	8.5005+02	8.4968+02	8.4447+02	8.4726+02
4		8.4428+02	8.4391+02	8.4410+02	8.3480+02	8.4187+02
5		8.4596+02	8.4559+02	8.4577+02	8.3517+02	8.4354+02
6		8.5488+02	8.5377+02	8.5433+02	8.4224+02	8.5210+02
7		8.7754+02	8.7865+02	8.7809+02	8.6721+02	8.7495+02
8		8.8771+02	8.8808+02	8.8790+02	8.7698+02	8.8494+02
9		8.8975+02	8.8882+02	8.8929+02	8.7717+02	8.8586+02
10		8.9617+02	8.9654+02	8.9636+02	8.8087+02	8.8919+02
11		8.9855+02	8.9892+02	8.9874+02	8.8161+02	8.8512+02
12		8.9672+02	8.9782+02	8.9727+02	8.6887+02	8.7292+02
13		1.2358+03	1.2362+03	1.2360+03	1.2287+03	1.2310+03
14		9.6659+02	9.6731+02	9.6695+02	9.5682+02	9.5917+02
15		9.2820+02	9.2802+02	9.2811+02	8.9453+02	9.0002+02
16		1.4775+03	1.4765+03	1.4770+03	1.4665+03	1.4707+03
17		1.4533+03	1.4531+03	1.4532+03	1.4356+03	1.4377+03
18		1.3859+03	1.3874+03	1.3866+03	1.3303+03	1.3332+03

*This parameter is appropriate only to the boiling runs and has been deleted from the liquid-liquid tabulation.

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	722	724	727	730	732	733
	VCOT-I	VCOT-A	VP VCI*	DPVC*	HCOT-I	HCOT-I
1	8.6022+02	8.5863+02			8.1339+02	8.1694+02
2	8.4354+02	8.4249+02			7.9880+02	8.0123+02
3	8.4800+02	8.4658+02			7.9730+02	7.9730+02
4	8.4168+02	8.3945+02			7.9786+02	7.9673+02
5	8.4391+02	8.4087+02			7.9992+02	7.9842+02
6	8.5061+02	8.4831+02			8.0347+02	8.0310+02
7	8.7680+02	8.7299+02			8.1526+02	8.1582+02
8	8.8605+02	8.8266+02			8.2401+02	8.2531+02
9	8.8494+02	8.8266+02			8.0647+02	8.0628+02
10	8.9030+02	8.8679+02			7.5443+02	7.5443+02
11	8.8420+02	8.8364+02			6.1824+02	6.1980+02
12	8.7163+02	8.7114+02			6.1512+02	6.1570+02
13	1.2320+03	1.2306+03			1.1349+03	1.1353+03
14	9.6007+02	9.5869+02			6.3532+02	6.3320+02
15	8.9965+02	8.9807+02			8.6427+02	8.6298+02
16	1.4690+03	1.4687+03			1.3983+03	1.3990+03
17	1.4379+03	1.4371+03			1.3190+03	1.3171+03
18	1.3344+03	1.3326+03			1.2675+03	1.2682+03

*These parameters are appropriate only to the boiling runs and have been deleted from the liquid-liquid tabulation.

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	735	737	739	741	746	747
	HCOT-A	HCAIT	HCAIT	HCAITA	HCAOTS	HCAOT-NE
1	8.1516+02	8.5228+01	8.3028+01	8.4128+01	7.0155+02	7.0155+02
2	8.0002+02	8.3952+01	8.1752+01	8.2852+01	6.8814+02	6.8856+02
3	7.9730+02	8.1136+01	7.8936+01	8.0036+01	6.8209+02	6.8209+02
4	7.9730+02	8.1202+01	7.9002+01	8.0102+01	6.8677+02	6.8677+02
5	7.9917+02	8.1158+01	7.8518+01	7.9838+01	6.8883+02	6.8883+02
6	8.0329+02	7.9728+01	7.7528+01	7.8628+01	6.9124+02	6.9124+02
7	8.1554+02	7.8496+01	7.7176+01	7.7836+01	6.9007+02	6.9007+02
8	8.2466+02	7.8958+01	7.7638+01	7.8298+01	6.9880+02	6.9880+02
9	8.0637+02	8.1092+01	7.9332+01	8.0212+01	6.8877+02	6.8793+02
10	7.5443+02	7.6626+01	7.4866+01	7.5746+01	6.4780+02	6.4822+02
11	6.1902+02	6.9828+01	6.7628+01	6.8728+01	5.3515+02	5.3471+02
12	6.1541+02	7.1148+01	6.9388+01	7.0268+01	5.5979+02	5.5935+02
13	1.1351+03	6.8266+01	6.5186+01	6.6726+01	9.7898+02	9.7814+02
14	6.3426+02	6.9806+01	6.9366+01	6.9586+01	4.6693+02	4.6649+02
15	8.6362+02	6.0325+02	4.0160+02	5.0242+02	2.1480+02	2.2844+02
16	1.3987+03	8.9958+01	8.4238+01	8.7098+01	1.2621+03	1.2608+03
17	1.3180+03	7.9772+01	8.0212+01	7.9992+01	1.1497+03	1.1489+03
18	1.2679+03	8.4740+02	6.6242+02	7.5491+02	3.2283+02	3.3479+02

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	748	749	751	755	756	757
	HCAOTN	HCAOTH	HCAOTA	HCCAOT	HCCAOT	HCCAOT
1	7.0067+02	6.9935+02	7.0078+02	8.3468+01	8.3028+01	8.2148+01
2	6.8772+02	6.8646+02	6.8772+02	8.1752+01	8.1312+01	8.1312+01
3	6.8125+02	6.7999+02	6.8135+02	7.9816+01	7.8496+01	7.8496+01
4	6.8551+02	6.8467+02	6.8593+02	7.9002+01	7.8562+01	7.8122+01
5	6.8757+02	6.8631+02	6.8788+02	7.9398+01	7.8078+01	7.8078+01
6	6.9040+02	6.8914+02	6.9051+02	7.7528+01	7.7088+01	7.7088+01
7	6.8881+02	6.8587+02	6.8870+02	7.7176+01	7.6736+01	7.6736+01
8	6.9792+02	6.9616+02	6.9792+02	7.8518+01	7.7198+01	7.7638+01
9	6.8667+02	6.8499+02	6.8709+02	7.9772+01	7.9332+01	7.8892+01
10	6.4696+02	6.4486+02	6.4696+02	7.5306+01	7.4426+01	7.4866+01
11	5.3383+02	5.3339+02	5.3427+02	6.8948+01	6.7628+01	6.7188+01
12	5.5935+02	5.5847+02	5.5924+02	6.9828+01	6.8508+01	6.8508+01
13	9.7688+02	9.7394+02	9.7699+02	6.6066+01	6.5186+01	6.4746+01
14	4.6517+02	4.6473+02	4.6583+02	7.1126+01	6.9806+01	6.9806+01
15	1.9764+02	1.9192+02	2.0820+02	8.9958+01	8.8638+01	9.3038+01
16	1.2582+03	1.2467+03	1.2569+03	8.3358+01	8.2478+01	8.2918+01
17	1.1464+03	1.1359+03	1.1452+03	7.5812+01	7.5372+01	7.6252+01
18	2.9886+02	2.8933+02	3.1145+02	9.2180+01	9.0860+01	9.8780+01

300 KW LIQ-LIQ DATA, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	759	766	770	777	779
	HCCAOA	WA	QA	DTLMHC	UOHC
1	8.2881+01	9.7763-02	1.4790+01	3.4513+02	2.1505+01
2	8.1459+01	9.7600-02	1.4473+01	3.3862+02	2.1449+01
3	7.8936+01	1.0749-01	1.5839+01	3.4445+02	2.3076+01
4	7.8562+01	9.7555-02	1.4487+01	3.3755+02	2.1537+01
5	7.8518+01	1.0655-01	1.5881+01	3.3796+02	2.3582+01
6	7.7235+01	1.0668-01	1.6002+01	3.4204+02	2.3478+01
7	7.6883+01	1.1910-01	1.7834+01	3.6408+02	2.4583+01
8	7.7785+01	1.1900-01	1.8083+01	3.6670+02	2.4747+01
9	7.9332+01	1.1814-01	1.7575+01	3.5840+02	2.4608+01
10	7.4866+01	1.1863-01	1.6574+01	3.4811+02	2.3893+01
11	6.7921+01	1.4844-01	1.6804+01	3.2260+02	2.6141+01
12	6.8948+01	8.5869-02	1.0223+01	2.8025+02	1.8306+01
13	6.5333+01	1.5041-01	3.4099+01	5.0380+02	3.3966+01
14	7.0246+01	5.2674-01	5.0597+01	4.3318+02	5.8617+01
15	9.0545+01	0.	-0.	5.1465+02	-0.
16	8.2918+01	7.3869-02	2.1894+01	5.4448+02	2.0180+01
17	7.5812+01	5.9743-02	1.6015+01	5.7466+02	1.3986+01
18	9.3940+01	0.	-0.	7.5121+02	-0.

APPENDIX B

Calculation Procedures Used in Appendix A

(300 KW Data Reduction)

APPENDIX B

CALCULATION PROCEDURES USED IN THE 300 KW TEST DATA REDUCTION

Physical Properties

The sodium physical properties used in the data reduction were taken from Reference 16. The potassium physical properties, with exception of the vapor pressure, were obtained from Reference 15. Vapor pressures were obtained from Reference 3.

Liquid Metal Flow Rates

Primary and secondary liquid metal flow rates were measured with magnetic flowmeters. The flowmeter constants were determined from the measured magnet strength using the procedure described in Reference 17.

Boiler Instrument Calibration

Liquid data were utilized to determine the sodium heat losses and allow calibration of the sodium and boiler wall thermocouples. These data consist of runs with no potassium in the secondary loop, so that the temperature change in the sodium across the boiler is due to heat losses and thermocouple error only. Heat losses through the boiler insulation are only a function of average sodium temperature. If it is assumed that the thermocouple errors are independent of the sodium flow rate, two runs at different sodium flow rates for the same average sodium temperature will allow determination of both the heat losses and thermocouple errors.

All sodium well thermocouples are calibrated by this method relative to a standard thermocouple. The heat losses (QL) may be expressed in terms of the two sodium flows ($PFLO_1$ and $PFLO_2$), the sodium capacity (C), and the standard reference temperature as follows:

$$QL = (PFLO_1)\ C\ (T_{ref1} - T_{1mj} - E_{R_j}) = (PFLO_2)\ C\ (T_{ref_2} - T_{2_{mj}} - E_{Rj})$$

The relative error E_{R_j} in thermocouple reading T_{mj} is defined in terms of the standard thermocouple reading T_j as:

$$T_j = T_{mj} + E_{R_j}$$

The above equations were applied to the sodium thermocouples to obtain their corrections and the heat losses at two temperatures. The values of heat loss were extrapolated to other temperatures by assuming that heat loss vs. average sodium temperature is linear on a log-log scale. The resultant equation is:

$$QL = 0.67 \left(\frac{\overline{T}_{Na}}{1000}\right)^{2.4}$$

where $\overline{T}_{Na}$ = ^{o}F and QL = Btu/sec.

The errors in the sodium thermocouples were expressed as linear functions of average sodium temperatures.

The boiler shell thermocouples were treated in a similar manner. In this case, however, the corrections were divided by the average sodium temperature to obtain fractional corrections, which were found to be more nearly independent of temperature. The resulting fractional corrections were then expressed as linear functions of average sodium temperature.

Sufficient liquid data were taken during this test series to allow calibration of the potassium well thermocouples and the insert thermocouples. The potassium well thermocouples were calibrated relative to a standard thermocouple at two temperature levels. The corrections were then expressed as linear functions of measured temperature. The insert thermocouple corrections were obtained using a technique similar to that used for the primary well thermocouples.

The boiler inlet and outlet pressure gages were calibrated by pressurizing the empty loop with inert gas at various know pressures.

Boiler Calculations

The boiler inlet pressure used to compute TSATKI is corrected for the liquid head above the pressure gage.

$$\text{BIP} = \text{BTP gage} - .003009\rho_{KL}$$

The subcooling of the potassium entering the boiler (DTSC) is the difference between the saturation temperature at the measured inlet pressure and the measured inlet temperature.

$$\text{DT} - \text{SC} = \text{TSATKI} - \text{SITI}$$

The rate of heat transfer required to remove the inlet subcooling, QSC, is calculated:

$$\text{QSC} = (\text{SFLO})\ C_K\ (\text{DTSC})\ \text{Btu/sec.}$$

The net heat transferred (QPRI) in the boiler is given by the product of the sodium mass flow rate and change in enthalpy less the heat losses, as follows, where POT-I and PIT-I were used to compute the enthalpy change:

$$QPRI = PFLO\ (\Delta H_{Na}) - QL\ \text{Btu/sec.}$$

The average heat flux (QFLUX) in the boiler is obtained by dividing the net heat transferred in the boiler by the boiler tube inside area, which is 1.6444 ft^2 for the data reported.

$$QFLUX = \frac{3600\ (QPRI)}{1.6444}\ \text{Btu/hr-ft}^2$$

The superficial vapor velocity at the boiler exit (VVEL-B) is given as follows where flow area of boiler $(A_B) = 0.00404\ ft^2$:

$$VVEL\text{-}B = VFV\text{-}B/A_B$$

where VFV-B = volumetric vapor flow rate, $\frac{ft^3}{sec.}$

The potassium and sodium mass velocities are given respectively as:

$$G\text{-}K = \left(\frac{3600}{A_B}\right)\ (SFLO)\ \text{lb/ft}^2\ \text{hr.}$$

where $A_B = .00404\ ft^2$

$$G\text{-}NA = \frac{3600}{A_{NA}}\ (PFLO)\ \text{lb/ft}^2\ \text{hr.}$$

where $A_{NA} = .017848\ ft^2$

The quality of the vapor leaving the boiler (QUAL-B) is the vapor mass flow rate divided by the total potassium mass flow rate as follows:

$$QUAL\text{-}B = \frac{(VFV\text{-}B)\ \rho V}{SFLO}$$

The two-phase potassium pressure drop across the vertical condenser (DP-VC) was determined from the difference in potassium vapor pressure across the condenser, determined from the inlet and outlet temperatures.

Horizontal Condenser Calculations

The air mass flow rate (WA) was determined by means of an orifice in the air line leading to the condenser. The heat transferred to the air, QA, in the horizontal condenser was calculated as the product of the air mass flow rate and the change in enthalpy of the air. The bulk air outlet temperatures (HCOT) were not used to calculate the outlet air enthalpy, as these thermocouples see the hot condenser tube and are subject to a radiation error. The temperature indicated by a thermocouple positioned further down the horizontal condenser air outlet line (HCAO-H) was used for this purpose, since this latter thermocouple is believed to have no radiation error.

The overall logarithmic mean temperature difference in the horizontal condenser (DTLMHC) was calculated from the potassium to air inlet and exit temperature differences as follows:

$$\text{DTLMHC} = \frac{\Delta T_{out} - \Delta T_{in}}{\log_e \dfrac{\Delta T_{out}}{\Delta T_{in}}}$$

The overall heat transfer coefficient in the horizontal condenser (UO HC) was computed as follows, where A_c, the heat transfer areas, is 7.174 ft^2.

$$\text{UO HC} = \frac{3600\ (\text{QA})}{A_c\ (\text{DTLMHC})}\ \text{Btu/hr-ft}^2\ {}^{o}\text{F}$$

APPENDIX C

Evaluation of the Reduced 300 KW Data of Appendix A

Table C-1

Key to Table C-2

Symbol	Quantity	Unit
N_{Nu}	Nusselt Number $N_{Nu} = hd/K$	Dimensionless
N_{Pe}	Peclet Number $N_{Pe} = DV\rho CP/K$	Dimensionless
U_{ol}	Overall liquid heat transfer coefficient, in liquid-liquid operation	Btu/Hr ft^2 ^{o}F
R_{KW}	Combined Resistance of the wall and potassium film	Hr ft^2 ^{o}F/Btu

Table C-2

SODIUM HEAT TRANSFER COEFFICIENTS, 300 KW FACILITY (CALCULATED FROM THE DATA OF TABLE A-3 OF APPENDIX A)

Date	Time	U_{ol}.	$(N_{Pe})_{Na}$	$R_{KW} X 10^{+3}$ (B=5)	$R_{KW} X 10^{+3}$ (B=7)	$(N_{Nu})_{Na}$
5/12/64	2100	1713.4	2484.8	-	-	-
	2215	1715.4	1852.8	-	-	-
	2345	1662.0	1021.7	.3837	.3106	9.546
5/13/64	0059	1427.4	408.14	.3928	.3134	6.761
	0208	1300.7	203.43	.4014	.3237	5.664
	0300	1259.5	124.65	.3928	.3179	5.186
	1030	1243.9	124.95	.4028	.3279	5.187
	1230	1602.9	1041.6	.4078	.3349	9.629

Average R_{KW} for B=5 .0003969

Standard Deviation in R_{KW} for B=5 2.20146%

Average R_{KW} for B=7 .0003214

Standard Deviation in R_{KW} for B=7 2.86061%

Table C-3

Key to Table C-4

Column No.	Title	Description
104	DATE	5.1940 = 5/19/64
103	TIME	1445 = Navy time
104	PFLO*	Primary (sodium) flow rate, lb/sec.
105	SFLO*	Secondary (potassium) flow rate, lb/sec.
106	SOT-A*	Average secondary (potassium) boiler outlet temperature, °F.
107	SIT-A*	Average secondary (potassium) boiler inlet temperature, °F.
108	PIT-A*	Average primary (sodium) boiler inlet temperature, °F.
109	POT-A*	Average primary (sodium) boiler outlet temperature, °F.
110	TBI	Temperature at which boiling initiates, determined from insert thermocouples, °F.
111	TKO	Temperature indicated by insert thermocouple at potassium boiler exit °F.
114	QUAL*	Potassium quality at exit of boiler tube.
115	QPRI*	Net heat transferred from sodium, Btu/sec.
119	QSC	Heat transferred in subcooled heating region, Btu/sec.
123	DTNASC	Sodium temperature change in subcooled heating region, °F.

Table C-3 (Continued)

Column No.	Title	Description
178	LSCH	Length of boiler tube in sub-cooled heating region, inches.
179	PE-NA	Sodium Peclet Number
180	PE-K	Potassium Peclet Number
188	RE-KL	Potassium liquid Reynold's Number
190	HNA	Sodium heat transfer coefficient based upon boiler tube ID, Btu/(hr-ft^2-^{o}F).
191	HBW	Equivalent heat transfer co-efficient of boiler tube wall, based upon the tube ID Btu/(hr-ft^2-^{o}F).
192	DTOI	Overall sodium to potassium temperature difference at potassium boiler inlet, ^{o}F.
193	DTOBI	Overall sodium to potassium temperature difference at initiation of boiling, ^{o}F.
194	DTOE	Overall sodium to potassium temperature difference at potassium boiler exit, ^{o}F.
197	DTOBAA	Arithmetic average of DTOE and DTOBI, ^{o}F.
202	DTOBLA	Logarithmic average of DTOE and DTOBI, ^{o}F.
211	Q/A - AB	Average heat flux in the boiling region, Btu/(hr-ft^2).
213	UOB-AA	Average overall boiling heat transfer coefficient, based upon the arithmetic average boiling temperature difference, Btu/(hr-ft^2-^{o}F).

Table C-3 (Continued)

Column No.	Title	Description
214	UOB-LA	Average overall boiling heat transfer coefficient, based upon the logarithmic average boiling temperature difference Btu/(hr-ft^2-^{o}F).
230	HAK-AA	Average potassium boiling heat transfer coefficient, based upon the arithmetic average boiling temperature difference, Btu/(hr-ft^2-^{o}F).
234	HAK-LA	Average potassium boiling heat transfer coefficient, based upon the logarithmic average boiling temperature difference, Btu/(hr-ft^2-^{o}F).
243	DP-KL	Pressure drop in the boiling region calculated for all liquid flow, psi.
270	DP-M	Calculated momentum pressure drop, psi.
272	BOP-G	Measured potassium boiler outlet pressure, psi.
291	BIP-BI	Potassium pressure at initiation of boiling, psi.
292	DPB-G	(BIP-BI) - (BOP-G)
296	TPFM	Two phase frictional pressure drop multiplier, equal to [(DPB-G) - (DP-M)]/(DP-KL).

* These quantities obtained from Table of this report.

TABLE C-4

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	102	103	104	105	106	107
	DATE	TIME	PFLO	SFLO	SOT-A	SIT-A
1	5.1940+00	1.4450+03	6.7972+00	3.6839-01	1.1247+03	1.0549+03
2	5.1940+00	2.2150+03	7.0061+00	5.9219-01	1.2944+03	1.2067+03
3	5.2040+00	9.0000+02	6.9004+00	6.3215-01	1.4861+03	1.4245+03
4	5.2040+00	2.2000+03	6.7256+00	6.8956-01	1.7610+03	1.6951+03
5	5.2140+00	5.2800+02	6.7343+00	3.2190-01	1.7158+03	1.5910+03
6	5.2140+00	7.0000+02	6.7712+00	3.3627-01	1.7325+03	1.6135+03
7	5.2140+00	9.3000+02	6.7740+00	3.2224-01	1.7176+03	1.5936+03
8	5.2140+00	1.3000+03	6.7815+00	3.2128-01	1.7311+03	1.6047+03
9	5.2140+00	1.7300+03	6.8438+00	3.2113-01	1.7314+03	1.6005+03
10	5.2140+00	1.9000+03	6.8816+00	2.7779-01	1.6965+03	1.5579+03
11	5.2140+00	2.0000+03	6.8582+00	2.5762-01	1.6973+03	1.5400+03
12	5.2140+00	2.1000+03	6.8539+00	2.3839-01	1.7018+03	1.5405+03
13	5.2140+00	2.2000+03	6.9141+00	2.1004-01	1.6985+03	1.5249+03
14	5.2140+00	2.3000+03	6.9089+00	1.9432-01	1.7031+03	1.5047+03
15	5.2140+00	2.4000+03	6.7796+00	1.7288-01	1.7162+03	1.4969+03
16	5.2240+00	1.0000+02	6.8352+00	1.6861-01	1.7169+03	1.4968+03
17	5.2240+00	3.3800+02	6.8230+00	1.7763-01	1.7282+03	1.5156+03
18	5.2240+00	6.5000+02	6.8113+00	1.6933-01	1.7124+03	1.5212+03
19	5.2240+00	1.1000+03	6.8278+00	8.7080-02	1.7133+03	1.4012+03
20	5.2240+00	1.4000+03	6.9207+00	2.7999-01	1.6481+03	1.5183+03
21	5.2240+00	1.7300+03	6.9505+00	3.2313-01	1.6091+03	1.4968+03
22	5.2240+00	2.1300+03	6.9860+00	3.1493-01	1.5464+03	1.4326+03
23	5.2240+00	2.4000+03	6.8473+00	3.0261-01	1.5606+03	1.4394+03
24	5.2340+00	3.0000+02	6.9308+00	3.1619-01	1.5354+03	1.4240+03
25	5.2340+00	4.3000+02	6.8954+00	3.0443-01	1.5517+03	1.4376+03
26	5.2340+00	1.1300+03	6.9101+00	3.3470-01	1.5686+03	1.4818+03
27	5.2340+00	1.3530+03	7.0757+00	3.8465-01	1.5857+03	1.4777+03
28	5.2340+00	1.4300+03	7.0754+00	2.7800-01	1.5861+03	1.4569+03
29	5.2340+00	2.3000+03	6.9167+00	6.0947-01	1.5467+03	1.4780+03
30	5.2440+00	3.0000+01	6.8669+00	6.4836-01	1.5651+03	1.5045+03
31	5.2440+00	3.3000+02	6.8747+00	6.1793-01	1.6103+03	1.5490+03
32	5.2440+00	8.3000+02	6.9661+00	6.3848-01	1.5779+03	1.5226+03
33	5.2440+00	1.2000+03	6.8578+00	6.2896-01	1.5499+03	1.4964+03
34	5.2440+00	1.3000+03	6.8640+00	5.0485-01	1.5430+03	1.4777+03
35	5.2440+00	1.4000+03	6.9297+00	2.6122-01	1.5103+03	1.3971+03
36	5.2440+00	1.6300+03	6.7631+00	2.3169-01	1.5882+03	1.4361+03
37	5.2440+00	1.8000+03	6.8404+00	2.2087-01	1.5721+03	1.4275+03
38	5.2440+00	1.9300+03	6.9518+00	1.9055-01	1.5672+03	1.3939+03
39	5.2440+00	1.9300+03	6.9445+00	1.9022-01	1.5809+03	1.3829+03
40	5.2540+00	3.0000+01	6.8239+00	1.6313-01	1.5766+03	1.3772+03

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	108	109	110	111	114	115
	PIT-A	POT-A	TBI	TKO	QUAL	QPRI
1	1.2255+03	1.2193+03	1.2240+03	1.2080+03	2.0650-02	1.1466+01
2	1.4033+03	1.3881+03	1.3870+03	1.3099+03	4.0780-02	3.0523+01
3	1.5836+03	1.5673+03	1.5480+03	1.4912+03	4.7570-02	3.2497+01
4	1.8248+03	1.8073+03	1.7760+03	1.7610+03	4.7100-02	3.4401+01
5	1.8406+03	1.8064+03	1.7550+03	1.7170+03	2.4719-01	6.9632+01
6	1.8500+03	1.8179+03	1.7660+03	1.7339+03	2.2220-01	6.5605+01
7	1.8129+03	1.7865+03	1.7400+03	1.7171+03	1.8148-01	5.3367+01
8	1.7965+03	1.7776+03	1.7405+03	1.7294+03	1.1773-01	3.7551+01
9	1.7755+03	1.7624+03	1.7355+03	1.7301+03	6.6660-02	2.5298+01
10	1.7609+03	1.7427+03	1.7075+03	1.6948+03	1.3217-01	3.6485+01
11	1.7621+03	1.7434+03	1.7082+03	1.6958+03	1.4522-01	3.7413+01
12	1.7658+03	1.7470+03	1.7125+03	1.6995+03	1.6069-01	3.7638+01
13	1.7641+03	1.7447+03	1.7095+03	1.6988+03	1.9527-01	3.9317+01
14	1.7671+03	1.7478+03	1.7135+03	1.7033+03	2.0708-01	3.9088+01
15	1.7750+03	1.7562+03	1.7245+03	1.7169+03	2.2087-01	3.7244+01
16	1.7688+03	1.7518+03	1.7218+03	1.7162+03	2.0059-01	3.3721+01
17	1.7666+03	1.7536+03	1.7307+03	1.7281+03	1.2614-01	2.5062+01
18	1.7456+03	1.7346+03	1.7140+03	1.7115+03	1.0847-01	2.0908+01
19	1.7412+03	1.7303+03	1.7123+03	1.7119+03	2.2396-01	2.0600+01
20	1.6888+03	1.6769+03	1.6560+03	1.6476+03	7.0520-02	2.3031+01
21	1.6519+03	1.6403+03	1.6206+03	1.6086+03	5.9410-02	2.2703+01
22	1.6487+03	1.6263+03	1.5910+03	1.5494+03	1.5245-01	4.6046+01
23	1.6406+03	1.6215+03	1.5915+03	1.5624+03	1.2573-01	3.8075+01
24	1.6076+03	1.5911+03	1.5655+03	1.5376+03	1.0061-01	3.2899+01
25	1.6146+03	1.5995+03	1.5755+03	1.5535+03	9.2810-02	2.9840+01
26	1.6122+03	1.6015+03	1.5825+03	1.5683+03	5.4980-02	2.0714+01
27	1.6389+03	1.6280+03	1.6215+03	1.5855+03	4.2950-02	2.1711+01
28	1.6398+03	1.6270+03	1.6025+03	1.5862+03	8.2100-02	2.5581+01
29	1.6659+03	1.6416+03	1.6105+03	1.5518+03	8.3260-02	4.9520+01
30	1.6654+03	1.6437+03	1.6160+03	1.5673+03	6.8400-02	4.3678+01
31	1.6921+03	1.6731+03	1.6450+03	1.6122+03	6.1620-02	3.8080+01
32	1.6448+03	1.6302+03	1.6104+03	1.5783+03	4.2820-02	2.9151+01
33	1.5955+03	1.5856+03	1.5730+03	1.5503+03	2.3350-02	1.8699+01
34	1.5868+03	1.5767+03	1.5625+03	1.5430+03	3.0200-02	1.9035+01
35	1.5766+03	1.5621+03	1.5373+03	1.5114+03	1.0706-01	2.8730+01
36	1.6549+03	1.6371+03	1.6075+03	1.5889+03	1.4969-01	3.4890+01
37	1.6552+03	1.6347+03	1.6000+03	1.5726+03	1.9464-01	4.0989+01
38	1.6526+03	1.6311+03	1.5960+03	1.5673+03	2.4297-01	4.3871+01
39	1.6642+03	1.6420+03	1.6070+03	1.5813+03	2.4678-01	4.5187+01
40	1.6553+03	1.6341+03	1.6005+03	1.5771+03	2.7422-01	4.2414+01

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	119	123	178	179	180	188
	QSC	DTNASC	LSCH	PE-NA	PE-K	RE-KL
1	1.1702+01	5.7366+00	7.2700+01	1.0360+03	2.1081+02	6.2095+04
2	2.0596+01	9.7451+00	5.2700+01	1.1235+03	3.7984+02	1.0755+05
3	1.5796+01	7.4919+00	3.8500+01	1.1679+03	4.7657+02	1.2442+05
4	1.2106+01	5.7300+00	3.2700+01	1.2200+03	6.6941+02	1.4978+05
5	1.1253+01	5.3203+00	3.8700+01	1.2244+03	2.9209+02	6.9103+04
6	1.0991+01	5.1593+00	3.6700+01	1.2351+03	3.1041+02	7.2554+04
7	1.0043+01	4.7327+00	2.4400+01	1.2225+03	2.9053+02	6.8988+04
8	9.3090+00	4.3870+00	2.5500+01	1.2195+03	2.9141+02	6.8944+04
9	9.2356+00	4.3212+00	2.7700+01	1.2244+03	2.8989+02	6.8857+04
10	8.7527+00	4.0830+00	2.4700+01	1.2251+03	2.4159+02	5.8878+04
11	9.1004+00	4.2593+00	2.4500+01	1.2213+03	2.2197+02	5.4620+04
12	8.6193+00	4.0348+00	2.5500+01	1.2218+03	2.0594+02	5.0617+04
13	8.1241+00	3.7710+00	3.7700+01	1.2318+03	1.7962+02	4.4567+04
14	8.4833+00	3.9391+00	2.7200+01	1.2320+03	1.6470+02	4.1296+04
15	8.2343+00	3.8922+00	3.2700+01	1.2117+03	1.4679+02	3.6906+04
16	7.9355+00	3.7226+00	2.4500+01	1.2198+03	1.4294+02	3.5972+04
17	8.0238+00	3.7699+00	2.5200+01	1.2176+03	1.5289+02	3.8041+04
18	6.8423+00	3.2282+00	2.4200+01	1.2085+03	1.4487+02	3.6043+04
19	5.5879+00	2.6314+00	2.8200+01	1.2099+03	7.0190+01	1.8531+04
20	7.9872+00	3.7348+00	2.3400+01	1.2080+03	2.3218+02	5.8192+04
21	8.2230+00	3.8440+00	2.5700+01	1.2007+03	2.6094+02	6.6154+04
22	1.0160+01	4.7328+00	2.6900+01	1.2039+03	2.4304+02	6.3310+04
23	9.3826+00	4.4615+00	2.5900+01	1.1778+03	2.3438+02	6.1003+04
24	9.0745+00	4.2764+00	2.5900+01	1.1815+03	2.4010+02	6.3073+04
25	8.5396+00	4.0421+00	2.6200+01	1.1780+03	2.3372+02	6.1055+04
26	6.8949+00	3.2560+00	2.4700+01	1.1805+03	2.6350+02	6.7429+04
27	1.1356+01	5.2218+00	4.2700+01	1.2180+03	3.0794+02	7.8392+04
28	8.2800+00	3.8079+00	2.5500+01	1.2179+03	2.1834+02	5.6445+04
29	1.6562+01	7.7788+00	3.6700+01	1.1974+03	4.8544+02	1.2308+05
30	1.4862+01	7.0295+00	3.7900+01	1.1891+03	5.2434+02	1.3150+05
31	1.2337+01	5.8100+00	3.7900+01	1.1998+03	5.1706+02	1.2723+05
32	1.1544+01	5.3903+00	3.1200+01	1.2005+03	5.1939+02	1.2964+05
33	9.8510+00	4.6939+00	3.7700+01	1.1660+03	4.9638+02	1.2599+05
34	8.7295+00	4.1590+00	4.0200+01	1.1639+03	3.9281+02	1.0076+05
35	7.3693+00	3.4819+00	2.7700+01	1.1707+03	1.9373+02	5.1517+04
36	8.1045+00	3.8950+00	3.4000+01	1.1683+03	1.8057+02	4.7116+04
37	7.7627+00	3.6896+00	3.2700+01	1.1813+03	1.7078+02	4.4697+04
38	7.8023+00	3.6504+00	2.5700+01	1.1995+03	1.4472+02	3.8488+04
39	8.6331+00	4.0385+00	2.6700+01	1.2020+03	1.4447+02	3.8619+04
40	7.3665+00	3.5100+00	2.7900+01	1.1784+03	1.2325+02	3.3046+04

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	190 HNA	191 HBW	192 DTOI	193 DTOBI	194 DTOE	197 DTOBAA
1	4.1386+03	4.0454+03	1.6440+02	1.0366+00	1.7500+01	9.2683+00
2	4.1047+03	4.3848+03	1.8140+02	1.0845+01	9.3400+01	5.2123+01
3	4.0121+03	4.7583+03	1.4280+02	2.6792+01	9.2400+01	5.9596+01
4	3.9298+03	5.3331+03	1.1220+02	3.7030+01	6.3800+01	5.0415+01
5	3.9319+03	5.3269+03	2.1540+02	5.6720+01	1.2360+02	9.0160+01
6	3.9418+03	5.3514+03	2.0440+02	5.7059+01	1.1610+02	8.6580+01
7	3.9439+03	5.2756+03	1.9290+02	5.1233+01	9.5800+01	7.3516+01
8	3.9472+03	5.2564+03	1.7290+02	4.1487+01	6.7100+01	5.4293+01
9	3.9662+03	5.2252+03	1.6190+02	3.1221+01	4.5400+01	3.8311+01
10	3.9781+03	5.1740+03	1.8480+02	3.9283+01	6.6100+01	5.2692+01
11	3.9716+03	5.1763+03	2.0340+02	3.9459+01	6.6300+01	5.2880+01
12	3.9701+03	5.1859+03	2.0650+02	3.8535+01	6.6300+01	5.2417+01
13	3.9869+03	5.1802+03	2.1980+02	3.8971+01	6.5300+01	5.2136+01
14	3.9852+03	5.1886+03	2.4310+02	3.8239+01	6.3800+01	5.1020+01
15	3.9487+03	5.2114+03	2.5930+02	3.5592+01	5.8100+01	4.6846+01
16	3.9646+03	5.2007+03	2.5500+02	3.3723+01	5.2600+01	4.3161+01
17	3.9612+03	5.2087+03	2.3800+02	2.6670+01	3.8500+01	3.2585+01
18	3.9598+03	5.1634+03	2.1340+02	2.3828+01	3.4100+01	2.8964+01
19	3.9647+03	5.1561+03	3.2910+02	2.0631+01	2.9300+01	2.4966+01
20	3.9962+03	5.0232+03	1.5860+02	2.4635+01	4.1200+01	3.2917+01
21	4.0106+03	4.9334+03	1.4350+02	2.3544+01	4.3300+01	3.3422+01
22	4.0217+03	4.8926+03	1.9370+02	4.0033+01	9.9300+01	6.9666+01
23	3.9848+03	4.8832+03	1.8210+02	3.4461+01	7.8200+01	5.6331+01
24	4.0128+03	4.8099+03	1.6710+02	2.9876+01	7.0000+01	4.9938+01
25	4.0018+03	4.8310+03	1.6190+02	2.8042+01	6.1100+01	4.4571+01
26	4.0059+03	4.8367+03	1.1970+02	2.2256+01	4.3900+01	3.3078+01
27	4.0468+03	4.9183+03	1.5030+02	1.1722+01	5.3400+01	3.2561+01
28	4.0468+03	4.8958+03	1.7010+02	2.8308+01	5.3600+01	4.0954+01
29	4.0001+03	4.9382+03	1.6360+02	3.8879+01	1.1410+02	7.6489+01
30	3.9863+03	4.9444+03	1.3920+02	3.4729+01	9.8100+01	6.6415+01
31	3.9836+03	5.0136+03	1.2410+02	3.3910+01	7.9900+01	5.6905+01
32	4.0163+03	4.9119+03	1.0760+02	2.5190+01	6.6500+01	4.5845+01
33	3.9957+03	4.8042+03	8.9200+01	1.7294+01	4.5200+01	3.1247+01
34	4.0002+03	4.7803+03	9.9000+01	1.8359+01	4.3800+01	3.1079+01
35	4.0220+03	4.7363+03	1.6500+02	2.8282+01	6.5200+01	4.6741+01
36	3.9592+03	4.9208+03	2.0100+02	3.3495+01	6.6000+01	4.9747+01
37	3.9806+03	4.9119+03	2.0720+02	3.8390+01	8.2600+01	6.0495+01
38	4.0117+03	4.9037+03	2.3720+02	3.8750+01	8.5300+01	6.2025+01
39	4.0078+03	4.9317+03	2.5910+02	3.9038+01	8.2900+01	6.0969+01
40	3.9761+03	4.9126+03	2.5690+02	3.7110+01	7.8200+01	5.7655+01

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	202	211	213	214	230	234
	DTOBLA	Q/A-AB	UOB-AA	UOB-LA	HAK-AA	HAK-LA
1	5.8252+00	-2.2568+03	-2.4350+02	-3.8743+02	-2.1760+02	-3.2574+02
2	3.8341+01	4.5850+04	8.7966+02	1.1959+03	1.5035+03	2.7432+03
3	5.2994+01	5.6450+04	9.4720+02	1.0652+03	1.6769+03	2.0860+03
4	4.9207+01	6.7917+04	1.3472+03	1.3802+03	3.3297+03	3.5393+03
5	8.5862+01	1.9807+05	2.1968+03	2.3068+03	7.6081+04	-1.1689+05
6	8.3114+01	1.7853+05	2.0620+03	2.1480+03	2.2517+04	4.0005+04
7	7.1207+01	1.1564+05	1.5730+03	1.6240+03	5.1917+03	5.7923+03
8	5.3271+01	7.6641+04	1.4116+03	1.4387+03	3.7761+03	3.9764+03
9	3.7869+01	4.5093+04	1.1770+03	1.1908+03	2.4626+03	2.5234+03
10	5.1534+01	7.4356+04	1.4112+03	1.4429+03	3.7881+03	4.0255+03
11	5.1724+01	7.5685+04	1.4313+03	1.4632+03	3.9416+03	4.1940+03
12	5.1168+01	7.8749+04	1.5023+03	1.5390+03	4.5267+03	4.8770+03
13	5.1008+01	1.0386+05	1.9922+03	2.0362+03	1.7211+04	2.1166+04
14	4.9934+01	8.5251+04	1.6709+03	1.7073+03	6.4597+03	7.0387+03
15	4.5931+01	8.8373+04	1.8864+03	1.9240+03	1.1770+04	1.3404+04
16	4.2464+01	6.8930+04	1.5970+03	1.6232+03	5.5052+03	5.8297+03
17	3.2224+01	4.6028+04	1.4125+03	1.4284+03	3.7950+03	3.9114+03
18	2.8658+01	3.7433+04	1.2924+03	1.3062+03	3.0529+03	3.1311+03
19	2.4713+01	4.2478+04	1.7014+03	1.7189+03	7.0640+03	7.3741+03
20	3.2211+01	3.9565+04	1.2019+03	1.2283+03	2.6132+03	2.7412+03
21	3.2425+01	3.9414+04	1.1793+03	1.2156+03	2.5258+03	2.6981+03
22	6.5240+01	9.9497+04	1.4282+03	1.5251+03	4.0461+03	4.9343+03
23	5.3377+01	7.8339+04	1.3907+03	1.4677+03	3.7975+03	4.4322+03
24	4.7125+01	6.5048+04	1.3026+03	1.3803+03	3.2195+03	3.7403+03
25	4.2447+01	5.8424+04	1.3108+03	1.3764+03	3.2679+03	3.7085+03
26	3.1862+01	3.7052+04	1.1201+03	1.1629+03	2.2917+03	2.4780+03
27	2.7486+01	3.8015+04	1.1675+03	1.3831+03	2.4625+03	3.6686+03
28	3.9617+01	4.6950+04	1.1464+03	1.1851+03	2.3758+03	2.5481+03
29	6.9868+01	1.0774+05	1.4085+03	1.5420+03	3.8840+03	5.1020+03
30	6.1027+01	9.6307+04	1.4501+03	1.5781+03	4.2282+03	5.5382+03
31	5.3660+01	8.6035+04	1.5119+03	1.6033+03	4.7408+03	5.7732+03
32	4.2555+01	5.2302+04	1.1408+03	1.2290+03	2.3586+03	2.7696+03
33	2.9046+01	2.9461+04	9.4285+02	1.0143+03	1.6606+03	1.8957+03
34	2.9259+01	3.5988+04	1.1579+03	1.2300+03	2.4726+03	2.8262+03
35	4.4201+01	5.9968+04	1.2830+03	1.3567+03	3.1283+03	3.6061+03
36	4.7924+01	8.3443+04	1.6773+03	1.7412+03	7.1231+03	8.4361+03
37	5.7699+01	1.0122+05	1.6732+03	1.7542+03	6.9996+03	8.6771+03
38	5.8996+01	9.8179+04	1.5829+03	1.6642+03	5.6005+03	6.7705+03
39	5.8242+01	1.0104+05	1.6572+03	1.7348+03	6.6156+03	8.0536+03
40	5.5126+01	9.8701+04	1.7119+03	1.7905+03	7.7473+03	9.6660+03

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	243	270	272	291	292	296
	DP-KL	DP-M	BOP-G	BIP-BI	DPB-G	TPFM
1	6.8027-02	3.1196+00	4.7151+00	3.6988+00	-1.0163+00	-6.0798+01
2	2.9711-01	7.6370+00	8.9899+00	1.3846+01	4.8557+00	-9.3613+00
3	4.5045-01	4.7089+00	2.3011+01	3.1270+01	8.2589+00	7.8812+00
4	5.8072-01	2.2779+00	7.1409+01	7.6211+01	4.8022+00	4.3467+00
5	1.5558-01	2.8830+00	6.0526+01	6.8608+01	8.0815+00	3.3415+01
6	1.7320-01	2.7064+00	6.4384+01	7.2187+01	7.8032+00	2.9427+01
7	1.9798-01	2.1740+00	6.0699+01	6.7122+01	6.4230+00	2.1462+01
8	1.9390-01	1.3736+00	6.3434+01	6.7663+01	4.2288+00	1.4725+01
9	1.8726-01	7.8341-01	6.3204+01	6.6088+01	2.8837+00	1.1216+01
10	1.5545-01	1.2947+00	5.5775+01	6.0078+01	4.3030+00	1.9353+01
11	1.3836-01	1.2195+00	5.6380+01	6.0081+01	3.7008+00	1.7933+01
12	1.2057-01	1.1388+00	5.6754+01	6.0454+01	3.7003+00	2.1245+01
13	8.0385-02	1.0813+00	5.6524+01	5.8847+01	2.3233+00	1.5451+01
14	8.4971-02	9.6657-01	5.6870+01	5.9678+01	2.8077+00	2.1668+01
15	6.4616-02	7.8178-01	6.0152+01	6.1812+01	1.6604+00	1.3597+01
16	7.0764-02	6.7934-01	6.0382+01	6.1942+01	1.5604+00	1.2451+01
17	7.6112-02	4.5808-01	6.2714+01	6.3793+01	1.0788+00	8.1549+00
18	7.1529-02	3.7886-01	5.9173+01	6.0454+01	1.2810+00	1.2612+01
19	2.3445-02	2.0719-01	5.9288+01	6.0551+01	1.2630+00	4.5034+01
20	1.6023-01	8.3719-01	4.6232+01	4.9482+01	3.2496+00	1.5055+01
21	1.9390-01	1.0673+00	3.9446+01	4.2987+01	3.5409+00	1.2757+01
22	1.8245-01	3.0720+00	3.0736+01	3.7734+01	6.9984+00	2.1520+01
23	1.7396-01	2.2780+00	3.2215+01	3.7758+01	5.5430+00	1.8769+01
24	1.8631-01	2.2081+00	2.8579+01	3.3817+01	5.2379+00	1.6262+01
25	1.7474-01	1.7883+00	3.0612+01	3.5341+01	4.7291+00	1.6829+01
26	2.0782-01	1.2261+00	3.3170+01	3.7123+01	3.9525+00	1.3119+01
27	1.8937-01	1.1396+00	3.5984+01	3.9844+01	3.8600+00	1.4366+01
28	1.5306-01	1.1762+00	3.6123+01	3.9546+01	3.4227+00	1.4677+01
29	4.4081-01	6.0207+00	3.1013+01	4.0871+01	9.8579+00	8.7047+00
30	4.7568-01	5.3827+00	3.3833+01	4.1845+01	8.0117+00	5.5267+00
31	4.4167-01	3.8522+00	4.0172+01	4.6765+01	6.5925+00	6.2046+00
32	5.2235-01	3.2369+00	3.5006+01	4.1612+01	6.6060+00	6.4499+00
33	4.5461-01	1.9434+00	3.0828+01	3.5822+01	4.9943+00	6.7110+00
34	3.0583-01	1.6814+00	2.9688+01	3.4441+01	4.7528+00	1.0043+01
35	1.3367-01	1.7767+00	2.5343+01	3.0020+01	4.6768+00	2.1695+01
36	9.9895-02	1.4688+00	3.6207+01	4.0235+01	4.0283+00	2.5622+01
37	9.4676-02	1.8128+00	3.4392+01	3.9292+01	4.9005+00	3.2613+01
38	8.3837-02	1.7141+00	3.3262+01	3.8676+01	5.4136+00	4.4128+01
39	8.2358-02	1.6560+00	3.5090+01	4.0345+01	5.2553+00	4.3702+01
40	6.3355-02	1.3802+00	3.4336+01	3.8929+01	4.5925+00	5.0703+01

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	102	103	104	105	106	107
	DATE	TIME	PFLO	SFLO	SOT-A	SIT-A
41	5.2540+00	5.3000+02	6.8865+00	1.6029-01	1.5617+03	1.3517+03
42	5.2540+00	8.3000+02	6.8786+00	1.6498-01	1.5575+03	1.3723+03
43	5.2540+00	9.3000+02	6.8587+00	1.7336-01	1.5525+03	1.3758+03
44	5.2540+00	1.1000+03	6.9590+00	1.3105-01	1.5431+03	1.3212+03
45	5.2540+00	1.3000+03	6.9570+00	8.0610-02	1.5331+03	1.2051+03
46	5.2540+00	2.0000+03	6.8642+00	1.6204-01	1.6104+03	1.4119+03
47	5.2540+00	2.2300+03	6.8610+00	1.6100-01	1.6564+03	1.4504+03
48	5.2640+00	6.3000+02	6.8411+00	1.5818-01	1.7063+03	1.5002+03
49	5.2640+00	9.3000+02	6.7639+00	1.6466-01	1.7061+03	1.5015+03
50	5.2640+00	1.1000+03	6.7937+00	1.6223-01	1.6914+03	1.4881+03
51	5.2640+00	1.8000+03	6.8601+00	1.5618-01	1.6918+03	1.4957+03
52	5.2640+00	1.9300+03	6.8762+00	1.3619-01	1.6987+03	1.4578+03
53	5.2640+00	2.1300+03	6.8605+00	1.1672-01	1.6993+03	1.4306+03
54	5.2640+00	2.2300+03	6.8771+00	1.0792-01	1.6908+03	1.4079+03
55	5.2640+00	2.3000+03	6.8700+00	1.0776-01	1.6895+03	1.3997+03
56	5.2640+00	2.3450+03	6.8657+00	9.1010-02	1.7049+03	1.3875+03
57	5.2740+00	5.0000+00	6.8579+00	7.9995-02	1.6999+03	1.3524+03
58	5.2740+00	2.0000+01	6.8150+00	6.9974-02	1.6845+03	1.3234+03
59	5.2740+00	2.5000+01	6.8350+00	6.3280-02	1.6766+03	1.3010+03
60	5.2740+00	1.3000+02	7.1207+00	1.1468-01	1.5768+03	1.1942+03
61	5.2740+00	7.4500+02	6.8556+00	9.7160-02	1.6871+03	1.3845+03
62	5.2740+00	9.0000+02	6.8884+00	8.8830-02	1.6882+03	1.3796+03
63	5.2740+00	1.1300+03	6.7923+00	9.2790-02	1.7003+03	1.3660+03
64	5.2740+00	1.4000+03	6.6714+00	8.2370-02	1.7136+03	1.3550+03
65	5.2740+00	1.5000+03	6.8077+00	8.6330-02	1.7078+03	1.3419+03
66	6.3040+00	4.3000+02	6.9413+00	1.7579-01	1.5573+03	1.3903+03
67	6.3040+00	8.3000+02	6.9156+00	1.7123-01	1.5505+03	1.3725+03
68	6.3040+00	1.1300+03	6.9283+00	1.6310-01	1.5505+03	1.3718+03
69	6.3040+00	1.4300+03	6.8692+00	1.6099-01	1.5467+03	1.3677+03
70	6.3040+00	1.6000+03	6.9283+00	1.6274-01	1.5351+03	1.3551+03
71	6.3040+00	1.8000+03	6.9355+00	1.5644-01	1.5364+03	1.3554+03
72	6.3040+00	1.9300+03	6.8086+00	1.6039-01	1.5339+03	1.3491+03
73	6.3040+00	2.0450+03	6.7330+00	1.5422-01	1.5412+03	1.3461+03
74	6.3040+00	2.1300+03	6.8827+00	1.6071-01	1.5333+03	1.3585+03
75	6.3040+00	2.2000+03	6.8241+00	1.5635-01	1.5281+03	1.3479+03
76	6.3040+00	2.3000+03	6.7462+00	1.4784-01	1.5224+03	1.3346+03
77	7.0140+00	1.0000+03	6.9376+00	1.4871-01	1.5590+03	1.3703+03
78	7.0140+00	1.0300+03	6.8969+00	1.2315-01	1.5530+03	1.3270+03
79	7.0140+00	1.1300+03	6.9436+00	1.0188-01	1.5595+03	1.2766+03
80	7.0140+00	1.4000+03	6.9162+00	8.9400-02	1.5778+03	1.2557+03

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	108	109	110	111	114	115
	PIT-A	POT-A	TBI	TKO	QUAL	QPRI
41	1.6257+03	1.6081+03	1.5800+03	1.5624+03	2.1872-01	3.4966+01
42	1.5937+03	1.5826+03	1.5645+03	1.5569+03	1.1436-01	2.1341+01
43	1.5849+03	1.5746+03	1.5590+03	1.5523+03	9.5860-02	1.9560+01
44	1.5723+03	1.5624+03	1.5488+03	1.5434+03	1.2554-01	1.9100+01
45	1.5588+03	1.5490+03	1.5348+03	1.5334+03	2.1035-01	1.8938+01
46	1.6892+03	1.6666+03	1.6305+03	1.6123+03	3.0432-01	4.5712+01
47	1.7355+03	1.7115+03	1.6720+03	1.6570+03	3.3107-01	4.8578+01
48	1.7406+03	1.7291+03	1.7071+03	1.7057+03	1.2562-01	2.2116+01
49	1.7687+03	1.7491+03	1.7137+03	1.7063+03	2.5045-01	3.8813+01
50	1.7606+03	1.7408+03	1.7017+03	1.6917+03	2.5965-01	3.9481+01
51	1.8420+03	1.7986+03	1.7335+03	1.6910+03	6.9855-01	9.0873+01
52	1.8461+03	1.8016+03	1.7352+03	1.6984+03	8.2453-01	9.3574+01
53	1.8473+03	1.8023+03	1.7333+03	1.6995+03	9.7404-01	9.4310+01
54	1.8414+03	1.7978+03	1.7230+03	1.6899+03	1.0219+00	9.1727+01
55	1.8410+03	1.7971+03	1.7240+03	1.6889+03	1.0276+00	9.2250+01
56	1.8448+03	1.8037+03	1.7080+03	1.6710+03	1.1400+00	8.5931+01
57	1.8399+03	1.8037+03	1.6595+03	1.6541+03	1.1261+00	7.5258+01
58	1.8410+03	1.8064+03	1.6200+03	1.7623+03	1.2216+00	7.1507+01
59	1.8425+03	1.8093+03	1.5980+03	1.7626+03	1.2944+00	6.8591+01
60	1.7164+03	1.6793+03	1.6290+03	1.5757+03	7.7119-01	7.9543+01
61	1.7232+03	1.7099+03	1.6878+03	1.6861+03	2.6332-01	2.5872+01
62	1.7240+03	1.7105+03	1.6897+03	1.6879+03	3.0167-01	2.6396+01
63	1.7595+03	1.7382+03	1.7068+03	1.7005+03	5.0578-01	4.2596+01
64	1.7934+03	1.7649+03	1.7235+03	1.7131+03	8.0278-01	5.6883+01
65	1.7989+03	1.7671+03	1.7148+03	1.7078+03	8.8385-01	6.5229+01
66	1.6091+03	1.5949+03	1.5697+03	1.5580+03	1.5679-01	2.8122+01
67	1.6358+03	1.6134+03	1.5780+03	1.5512+03	2.8460-01	4.5454+01
68	1.6693+03	1.6403+03	1.5960+03	1.5505+03	4.0949-01	5.9761+01
69	1.6990+03	1.6625+03	1.6120+03	1.5483+03	5.3396-01	7.5231+01
70	1.7189+03	1.6773+03	1.6180+03	1.5370+03	6.1608-01	8.7094+01
71	1.7376+03	1.6924+03	1.6335+03	1.5369+03	7.0359-01	9.4823+01
72	1.7584+03	1.7079+03	1.6425+03	1.5329+03	7.5781-01	1.0444+02
73	1.7759+03	1.7227+03	1.6520+03	1.5398+03	8.2597-01	1.0907+02
74	1.7779+03	1.7243+03	1.6520+03	1.5318+03	8.2120-01	1.1260+02
75	1.7876+03	1.7318+03	1.6560+03	1.5276+03	8.7165-01	1.1625+02
76	1.8097+03	1.7500+03	1.6620+03	1.5216+03	9.8082-01	1.2339+02
77	1.6149+03	1.6004+03	1.5715+03	1.5571+03	1.9354-01	2.8821+01
78	1.6075+03	1.5919+03	1.5640+03	1.5519+03	2.5495-01	3.0884+01
79	1.6104+03	1.5953+03	1.5680+03	1.5583+03	2.9838-01	3.0208+01
80	1.6230+03	1.6080+03	1.5830+03	1.5764+03	3.3290-01	2.9570+01

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	119	123	178	179	180	188
	QSC	DTNASC	LSCH	PE-NA	PE-K	RE-KL
41	7.3579+00	3.4840+00	3.3700+01	1.1798+03	1.1874+02	3.2236+04
42	6.3785+00	3.0309+00	3.1700+01	1.1687+03	1.2248+02	3.3036+04
43	6.3858+00	3.0452+00	2.4700+01	1.1623+03	1.2859+02	3.4641+04
44	5.9481+00	2.7985+00	3.2700+01	1.1749+03	9.4476+01	2.6082+04
45	5.2211+00	2.4600+00	4.1700+01	1.1698+03	5.4953+01	1.5963+04
46	7.2267+00	3.4108+00	3.3700+01	1.1964+03	1.2621+02	3.3266+04
47	7.3514+00	3.4535+00	3.6700+01	1.2115+03	1.3032+02	3.3632+04
48	6.8306+00	3.2109+00	4.3200+01	1.2120+03	1.3326+02	3.3591+04
49	7.3028+00	3.4631+00	4.3700+01	1.2066+03	1.3933+02	3.5013+04
50	7.2147+00	3.4100+00	3.6500+01	1.2091+03	1.3549+02	3.4325+04
51	7.7820+00	3.6156+00	7.5000+00	1.2460+03	1.3318+02	3.3238+04
52	7.8833+00	3.6526+00	7.7000+00	1.2503+03	1.1391+02	2.9032+04
53	7.3431+00	3.4098+00	7.7000+00	1.2478+03	9.6326+01	2.4878+04
54	7.0338+00	3.2603+00	8.2000+00	1.2488+03	8.7705+01	2.2918+04
55	7.2203+00	3.3505+00	8.2000+00	1.2473+03	8.7278+01	2.2884+04
56	6.0000+00	2.7834+00	7.2000+00	1.2486+03	7.2733+01	1.9202+04
57	4.9895+00	2.3173+00	8.5000+00	1.2462+03	6.1378+01	1.6659+04
58	4.1778+00	1.9518+00	7.5000+00	1.2391+03	5.2097+01	1.4773+04
59	3.7638+00	1.7524+00	1.0500+01	1.2436+03	4.6210+01	1.3302+04
60	9.9007+00	4.4983+00	1.2700+01	1.2481+03	8.0948+01	2.3361+04
61	6.0368+00	2.8387+00	3.7700+01	1.2081+03	7.6787+01	2.0478+04
62	5.6413+00	2.6399+00	4.3100+01	1.2142+03	7.0102+01	1.8736+04
63	6.4849+00	3.0667+00	1.8000+01	1.2082+03	7.3351+01	1.9685+04
64	6.2323+00	2.9904+00	1.3700+01	1.1970+03	6.5294+01	1.7569+04
65	6.5896+00	3.0977+00	9.7000+00	1.2228+03	6.7714+01	1.8366+04
66	6.3644+00	2.9938+00	3.3400+01	1.1842+03	1.3182+02	3.5246+04
67	7.0922+00	3.3421+00	3.4500+01	1.1874+03	1.2788+02	3.4343+04
68	7.3861+00	3.4639+00	3.1700+01	1.1998+03	1.2271+02	3.2829+04
69	7.9537+00	3.7530+00	9.2000+00	1.1983+03	1.2174+02	3.2497+04
70	8.6434+00	4.0370+00	9.7000+00	1.2144+03	1.2272+02	3.2814+04
71	8.8098+00	4.1036+00	9.0000+00	1.2217+03	1.1876+02	3.1644+04
72	9.5333+00	4.5151+00	7.4000+00	1.2056+03	1.2190+02	3.2477+04
73	9.5653+00	4.5724+00	9.7000+00	1.1978+03	1.1753+02	3.1332+04
74	9.5789+00	4.4783+00	8.3000+00	1.2251+03	1.2322+02	3.2598+04
75	9.7742+00	4.6044+00	9.7000+00	1.2176+03	1.1949+02	3.1712+04
76	9.8127+00	4.6650+00	9.0000+00	1.2107+03	1.1260+02	2.9986+04
77	6.0235+00	2.8335+00	2.8000+01	1.1855+03	1.1064+02	2.9822+04
78	5.8378+00	2.7644+00	3.2700+01	1.1758+03	8.9613+01	2.4631+04
79	5.9075+00	2.7778+00	2.3700+01	1.1848+03	7.2615+01	2.0421+04
80	5.8185+00	2.7433+00	8.7000+00	1.1844+03	6.3550+01	1.8043+04

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	190	191	192	193	194	197
	HNA	HBW	DTOI	DTOBI	DTOE	DTOBAA
41	3.9978+03	4.8504+03	2.5640+02	3.1584+01	6.3300+01	4.7442+01
42	4.0021+03	4.7914+03	2.1030+02	2.1131+01	3.6800+01	2.8965+01
43	3.9993+03	4.7736+03	1.9880+02	1.8645+01	3.2600+01	2.5623+01
44	4.0306+03	4.7453+03	2.4120+02	1.6399+01	2.8900+01	2.2649+01
45	4.0342+03	4.7111+03	3.4390+02	1.6660+01	2.5400+01	2.1030+01
46	3.9816+03	4.9920+03	2.5470+02	3.9511+01	7.6900+01	5.8205+01
47	3.9749+03	5.1008+03	2.6110+02	4.2953+01	7.8500+01	6.0727+01
48	3.9685+03	5.1491+03	2.2890+02	2.5211+01	3.4900+01	3.0055+01
49	3.9450+03	5.1908+03	2.4760+02	3.8863+01	6.2400+01	5.0632+01
50	3.9540+03	5.1666+03	2.5270+02	4.2510+01	6.8900+01	5.5705+01
51	3.9670+03	5.3027+03	3.0290+02	6.8716+01	1.5100+02	1.0986+02
52	3.9714+03	5.3097+03	3.4380+02	7.0053+01	1.4770+02	1.0888+02
53	3.9670+03	5.3089+03	3.7170+02	7.2410+01	1.4780+02	1.1010+02
54	3.9718+03	5.2894+03	3.8990+02	7.8060+01	1.5150+02	1.1478+02
55	3.9698+03	5.2901+03	3.9740+02	7.6450+01	1.5210+02	1.1428+02
56	3.9684+03	5.2754+03	4.1620+02	9.8483+01	1.7380+02	1.3614+02
57	3.9664+03	5.2112+03	4.5130+02	1.4652+02	1.8580+02	1.6616+02
58	3.9544+03	5.1651+03	4.8300+02	1.8835+02	7.8700+01	1.3353+02
59	3.9598+03	5.1404+03	5.0830+02	2.1305+02	7.9900+01	1.4648+02
60	4.0483+03	5.0239+03	4.8510+02	5.4798+01	1.4070+02	9.7749+01
61	3.9740+03	5.1050+03	3.2540+02	2.4939+01	3.7100+01	3.1019+01
62	3.9830+03	5.1082+03	3.3090+02	2.3440+01	3.6100+01	2.9770+01
63	3.9538+03	5.1714+03	3.7220+02	3.4467+01	5.9000+01	4.6733+01
64	3.9174+03	5.2323+03	4.0990+02	4.4390+01	8.0300+01	6.2345+01
65	3.9548+03	5.2284+03	4.2520+02	5.5398+01	9.1100+01	7.3249+01
66	4.0152+03	4.8170+03	2.0460+02	2.8194+01	5.1100+01	3.9647+01
67	4.0046+03	4.8604+03	2.4090+02	3.8742+01	8.4600+01	6.1671+01
68	4.0031+03	4.9244+03	2.6850+02	4.7764+01	1.1880+02	8.3282+01
69	3.9824+03	4.9812+03	2.9480+02	5.4253+01	1.5070+02	1.0248+02
70	3.9956+03	5.0134+03	3.2220+02	6.3337+01	1.8190+02	1.2262+02
71	3.9961+03	5.0558+03	3.3700+02	6.3004+01	2.0070+02	1.3185+02
72	3.9596+03	5.0928+03	3.5880+02	6.9915+01	2.2550+02	1.4771+02
73	3.9373+03	5.1253+03	3.7660+02	7.5272+01	2.3610+02	1.5569+02
74	3.9785+03	5.1277+03	3.6580+02	7.6778+01	2.4610+02	1.6144+02
75	3.9616+03	5.1442+03	3.8390+02	8.0404+01	2.6000+02	1.7020+02
76	3.9381+03	5.1779+03	4.1540+02	9.2665+01	2.8810+02	1.9038+02
77	4.0133+03	4.8264+03	2.3010+02	3.1734+01	5.7800+01	4.4767+01
78	4.0035+03	4.8079+03	2.6490+02	3.0664+01	5.5600+01	4.3132+01
79	4.0157+03	4.8165+03	3.1870+02	3.0078+01	5.2100+01	4.1089+01
80	4.0062+03	4.8508+03	3.5230+02	2.7743+01	4.6600+01	3.7172+01

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	202	211	213	214	230	234
	DTOBLA	Q/A-AB	UOB-AA	UOB-LA	HAK-AA	HAK-LA
41	4.5619+01	8.5559+04	1.8035+03	1.8755+03	1.0184+04	1.3007+04
42	2.8245+01	4.4818+04	1.5473+03	1.5868+03	5.3271+03	5.8262+03
43	2.4976+01	3.5323+04	1.3786+03	1.4143+03	3.7614+03	4.0395+03
44	2.2062+01	4.0065+04	1.7689+03	1.8160+03	9.3917+03	1.0891+04
45	2.0724+01	4.9345+04	2.3464+03	2.3811+03	-2.9442+04	-2.4893+04
46	5.6146+01	1.1927+05	2.0491+03	2.1243+03	2.7366+04	5.1889+04
47	5.8951+01	1.3476+05	2.2192+03	2.2860+03	3.3491+05	-9.8151+04
48	2.9793+01	5.6697+04	1.8864+03	1.9030+03	1.1918+04	1.2613+04
49	4.9706+01	1.1810+05	2.3326+03	2.3760+03	-5.7378+04	-3.9583+04
50	5.4647+01	1.0509+05	1.8866+03	1.9231+03	1.1961+04	1.3598+04
51	1.0451+02	1.7714+05	1.6124+03	1.6949+03	5.5706+03	6.6957+03
52	1.0409+02	1.8312+05	1.6819+03	1.7592+03	6.4754+03	7.7934+03
53	1.0566+02	1.8585+05	1.6879+03	1.7589+03	6.5786+03	7.8070+03
54	1.1075+02	1.8207+05	1.5863+03	1.6440+03	5.2751+03	5.9722+03
55	1.0997+02	1.8280+05	1.5996+03	1.6622+03	5.4285+03	6.2237+03
56	1.3260+02	1.6980+05	1.2472+03	1.2806+03	2.7759+03	2.9467+03
57	1.6538+02	1.5161+05	9.1244+02	9.1672+02	1.5339+03	1.5460+03
58	1.2565+02	1.4354+05	1.0750+03	1.1423+03	2.0671+03	2.3316+03
59	1.3576+02	1.4333+05	9.7849+02	1.0557+03	1.7394+03	1.9993+03
60	9.1097+01	1.5827+05	1.6192+03	1.7374+03	5.8297+03	7.7217+03
61	3.0618+01	6.6045+04	2.1292+03	2.1571+03	4.5157+04	6.2244+04
62	2.9316+01	7.6825+04	2.5806+03	2.6206+03	-1.6855+04	-1.5328+04
63	4.5640+01	8.7990+04	1.8828+03	1.9279+03	1.1788+04	1.3812+04
64	6.0582+01	1.1659+05	1.8701+03	1.9245+03	1.1320+04	1.3659+04
65	7.1775+01	1.2838+05	1.7526+03	1.7886+03	7.9074+03	8.6969+03
66	3.8518+01	6.7080+04	1.6919+03	1.7415+03	7.4412+03	8.5060+03
67	5.8716+01	1.2056+05	1.9548+03	2.0532+03	1.7825+04	3.1655+04
68	7.7961+01	1.5688+05	1.8837+03	2.0123+03	1.2823+04	2.2691+04
69	9.4405+01	1.4639+05	1.4285+03	1.5507+03	4.0296+03	5.1807+03
70	1.1238+02	1.7175+05	1.4007+03	1.5282+03	3.7850+03	4.8873+03
71	1.1885+02	1.8671+05	1.4160+03	1.5710+03	3.8735+03	5.3050+03
72	1.3286+02	2.0209+05	1.3682+03	1.5211+03	3.5461+03	4.7954+03
73	1.4069+02	2.1784+05	1.3992+03	1.5484+03	3.7652+03	5.0827+03
74	1.4536+02	2.2174+05	1.3735+03	1.5254+03	3.5501+03	4.7805+03
75	1.5303+02	2.3310+05	1.3696+03	1.5233+03	3.5293+03	4.7695+03
76	1.7229+02	2.4654+05	1.2950+03	1.4309+03	3.0753+03	3.9715+03
77	4.3472+01	6.4304+04	1.4364+03	1.4792+03	4.1700+03	4.5522+03
78	4.1903+01	7.6299+04	1.7689+03	1.8208+03	9.2994+03	1.0938+04
79	4.0086+01	6.4193+04	1.5623+03	1.6014+03	5.4515+03	5.9591+03
80	3.6360+01	5.1369+04	1.3820+03	1.4128+03	3.7335+03	3.9674+03

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	243	270	272	291	292	296
	DP-KL	DP-M	BOP-G	BIP-BI	DPB-G	TPFM
41	5.5966-02	1.1372+00	3.1691+01	3.5332+01	3.6405+00	4.4729+01
42	6.0589-02	6.5737-01	3.1290+01	3.3879+01	2.5889+00	3.1879+01
43	7.3202-02	6.2147-01	3.0828+01	3.2918+01	2.0904+00	2.0067+01
44	4.1332-02	4.8320-01	2.9503+01	3.1657+01	2.1539+00	4.0421+01
45	1.6191-02	3.2022-01	2.7963+01	2.9697+01	1.7342+00	8.7330+01
46	5.7058-02	1.3407+00	3.9809+01	4.4071+01	4.2622+00	5.1201+01
47	5.3657-02	1.2369+00	4.7657+01	5.1585+01	3.9285+00	5.0163+01
48	4.6045-02	3.9151-01	5.7848+01	5.8690+01	8.4246-01	9.7938+00
49	4.8576-02	8.3452-01	4.7151+01	6.0149+01	1.2998+01	2.5040+02
50	5.4551-02	8.8009-01	5.4825+01	5.7825+01	3.0003+00	3.8866+01
51	7.8550-02	2.0767+00	5.5545+01	6.5919+01	1.0374+01	1.0563+02
52	6.3094-02	1.8345+00	5.6956+01	6.6280+01	9.3238+00	1.1870+02
53	4.9406-02	1.5940+00	5.6985+01	6.4584+01	7.5986+00	1.2154+02
54	4.3339-02	1.4806+00	5.4940+01	6.3894+01	8.9539+00	1.7244+02
55	4.3237-02	1.4844+00	5.4077+01	6.2877+01	8.7998+00	1.6919+02
56	3.3454-02	1.2452+00	5.0812+01	6.0471+01	9.6587+00	2.5150+02
57	2.6820-02	1.0690+00	3.8218+01	4.8930+01	1.0712+01	3.5954+02
58	2.1978-02	7.8444-01	3.0427+01	4.3901+01	1.3474+01	5.7738+02
59	1.8066-02	7.0561-01	2.5867+01	4.0055+01	1.4188+01	7.4629+02
60	4.4926-02	1.8251+00	3.5257+01	4.3746+01	8.4886+00	1.4832+02
61	2.3672-02	3.3080-01	5.3472+01	5.4452+01	9.8050-01	2.7445+01
62	1.8475-02	3.1477-01	5.3818+01	5.4977+01	1.1590+00	4.5698+01
63	3.0089-02	5.4730-01	5.6697+01	5.9428+01	2.7313+00	7.2583+01
64	2.6401-02	6.5002-01	5.9547+01	6.3087+01	3.5401+00	1.0947+02
65	2.9888-02	8.0548-01	5.8424+01	6.2416+01	3.9925+00	1.0663+02
66	6.5103-02	1.0100+00	3.1598+01	3.4188+01	2.5895+00	2.4262+01
67	6.1265-02	1.7341+00	3.0582+01	3.5719+01	5.1371+00	5.5545+01
68	5.9525-02	2.1865+00	3.0828+01	3.8728+01	7.8999+00	9.5983+01
69	8.0283-02	2.7043+00	3.1013+01	4.1864+01	1.0851+01	1.0148+02
70	8.1168-02	3.2211+00	2.9596+01	4.2741+01	1.3145+01	1.2226+02
71	7.6912-02	3.3008+00	2.9996+01	4.4089+01	1.4093+01	1.4032+02
72	8.1571-02	3.7021+00	2.9657+01	4.6625+01	1.6968+01	1.6263+02
73	7.4567-02	3.6198+00	3.1290+01	4.7681+01	1.6391+01	1.7127+02
74	8.0959-02	3.9656+00	3.0304+01	4.7964+01	1.7660+01	1.6915+02
75	7.6201-02	3.9854+00	3.0243+01	4.8902+01	1.8659+01	1.9256+02
76	7.0329-02	4.0096+00	2.8271+01	5.0610+01	2.2339+01	2.6062+02
77	5.4586-02	8.9058-01	3.1845+01	3.5121+01	3.2762+00	4.3704+01
78	3.7474-02	8.2597-01	3.1229+01	3.3707+01	2.4783+00	4.4093+01
79	3.2004-02	6.4746-01	3.1845+01	3.4667+01	2.8218+00	6.7941+01
80	3.1794-02	5.2084-01	3.4420+01	3.7237+01	2.8169+00	7.2216+01

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	102 DATE	103 TIME	104 PFLO	105 SFLO	106 SOT-A	107 SIT-A
81	7.0140+00	1.7300+03	6.9906+00	8.8900-02	1.5348+03	1.2150+03
82	7.0140+00	1.9300+03	6.9730+00	8.4590-02	1.5285+03	1.1904+03
83	7.0140+00	2.1000+03	6.9651+00	8.0535-02	1.5117+03	1.1902+03
84	7.0140+00	2.1200+03	6.9264+00	6.8380-02	1.5054+03	1.1817+03
85	7.0140+00	2.1300+03	6.9238+00	6.8320-02	1.5010+03	1.1748+03
86	7.0140+00	2.1550+03	6.9169+00	9.2350-02	1.4810+03	1.1689+03
87	7.0140+00	2.2250+03	6.9503+00	1.0278-01	1.5075+03	1.2003+03
88	7.0240+00	3.3000+02	6.9003+00	8.9180-02	1.5853+03	1.2481+03
89	7.0240+00	6.3000+02	6.2335+00	9.0940-02	1.5477+03	1.2272+03
90	7.0240+00	7.3000+02	5.5610+00	9.1090-02	1.5415+03	1.2392+03
91	7.0240+00	8.3000+02	4.8041+00	8.6900-02	1.5412+03	1.2259+03
92	7.0240+00	9.3000+02	2.6606+00	8.6830-02	1.5133+03	1.2172+03

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	108	109	110	111	114	115
	PIT-A	POT-A	TBI	TKO	QUAL	QPRI
81	1.6207+03	1.5991+03	1.5620+03	1.5356+03	5.3637-01	4.4233+01
82	1.6586+03	1.6259+03	1.5777+03	1.5275+03	9.0853-01	6.7979+01
83	1.6748+03	1.6382+03	1.5775+03	1.5092+03	1.0854+00	7.6304+01
84	1.6876+03	1.6557+03	1.5510+03	1.6018+03	1.1053+00	6.6012+01
85	1.6934+03	1.6601+03	1.5630+03	1.4637+03	1.1548+00	6.8811+01
86	1.6896+03	1.6497+03	1.5830+03	1.4895+03	1.0194+00	8.2901+01
87	1.6771+03	1.6386+03	1.5830+03	1.5072+03	8.8173-01	8.0106+01
88	1.6857+03	1.6568+03	1.6132+03	1.5851+03	7.4866-01	5.9365+01
89	1.6634+03	1.6302+03	1.5850+03	1.5474+03	7.5954-01	6.1542+01
90	1.6639+03	1.6266+03	1.5820+03	1.5404+03	7.6247-01	6.1622+01
91	1.6723+03	1.6280+03	1.5825+03	1.5387+03	8.2294-01	6.3260+01
92	1.6875+03	1.6151+03	1.5660+03	1.5127+03	7.3649-01	5.7138+01

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	119	123	178	179	180	188
	QSC	DTNASC	LSCH	PE-NA	PE-K	RE-KL
81	6.0856+00	2.8414+00	8.0000+00	1.1953+03	6.1520+01	1.7713+04
82	6.4623+00	3.0160+00	8.7000+00	1.2033+03	5.8329+01	1.6881+04
83	6.1523+00	2.8707+00	7.7000+00	1.2068+03	5.5524+01	1.6010+04
84	4.9593+00	2.3225+00	6.7000+00	1.2052+03	4.6479+01	1.3782+04
85	5.2134+00	2.4412+00	6.7000+00	1.2064+03	4.6535+01	1.3411+04
86	7.5322+00	3.5346+00	6.9000+00	1.2028+03	6.3264+01	1.8304+04
87	7.7709+00	3.6335+00	9.0000+00	1.2046+03	7.1305+01	2.0447+04
88	6.4907+00	3.0507+00	8.2000+00	1.2005+03	6.4042+01	1.8143+04
89	6.4481+00	3.3648+00	9.7000+00	1.0770+03	6.3869+01	1.8251+04
90	6.1948+00	3.6250+00	8.7000+00	9.6043+02	6.4238+01	1.8244+04
91	6.1380+00	4.1570+00	1.0700+01	8.3086+02	6.0926+01	1.7400+04
92	5.9796+00	7.3228+00	1.1700+01	4.6029+02	6.0237+01	1.7233+04

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	190	191	192	193	194	197
	HNA	HBW	DTCI	DTOBI	DTCE	DTOBAA
81	4.0274+03	4.8218+03	3.8410+02	3.9941+01	8.5100+01	6.2521+01
82	4.0174+03	4.8884+03	4.3550+02	5.1216+01	1.3110+02	9.1158+01
83	4.0129+03	4.9083+03	4.4800+02	6.3571+01	1.6560+02	1.1459+02
84	3.9997+03	4.8913+03	4.7400+02	1.0702+02	8.5800+01	9.6411+01
85	3.9981+03	4.9134+03	4.8530+02	9.9541+01	2.2970+02	1.6462+02
86	3.9974+03	4.9335+03	4.8080+02	7.0235+01	2.0010+02	1.3517+02
87	4.0086+03	4.9180+03	4.3830+02	5.9233+01	1.6990+02	1.1457+02
88	3.9926+03	4.9662+03	4.0870+02	4.6651+01	1.0060+02	7.3625+01
89	3.8123+03	4.9034+03	4.0300+02	4.8565+01	1.1600+02	8.2282+01
90	3.6225+03	4.9003+03	3.8740+02	4.8225+01	1.2350+02	8.5862+01
91	3.4019+03	4.9114+03	4.0210+02	4.9657+01	1.3360+02	9.1629+01
92	2.7354+03	4.9098+03	3.9790+02	5.6423+01	1.7480+02	1.1561+02

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	202	211	213	214	230	234
	DTCBLA	Q/A-AB	UOB-AA	UOB-LA	HAK-AA	HAK-LA
81	5.9701+01	8.1813+04	1.3086+03	1.3704+03	3.2415+03	3.6492+03
82	8.4991+01	1.3305+05	1.4595+03	1.5654+03	4.3165+03	5.3961+03
83	1.0657+02	1.4991+05	1.3083+03	1.4067+03	3.2111+03	3.8771+03
84	9.6021+01	1.2893+05	1.3373+03	1.3427+03	3.4092+03	3.4448+03
85	1.5565+02	1.3430+05	8.1583+02	8.6282+02	1.2952+03	1.4178+03
86	1.2404+02	1.5954+05	1.1803+03	1.2862+03	2.5355+03	3.0804+03
87	1.0502+02	1.5702+05	1.3705+03	1.4950+03	3.6120+03	4.6279+03
88	7.0204+01	1.1367+05	1.5439+03	1.6191+03	5.1049+03	6.0317+03
89	7.7450+01	1.2061+05	1.4659+03	1.5573+03	4.6308+03	5.6856+03
90	8.0049+01	1.1988+05	1.3962+03	1.4976+03	4.2350+03	5.3296+03
91	8.4816+01	1.2660+05	1.3817+03	1.4927+03	4.4211+03	5.8013+03
92	1.0469+02	1.1481+05	9.9304+02	1.0967+03	2.2844+03	2.9188+03

CALCULATED RESULTS, 1-IN. L-605 TUBE W/2-IN. HELICAL INSERT

	243	270	272	291	292	296
	DP-KL	DP-M	BOP-G	BIP-BI	DPB-G	TPFM
81	3.1742-02	9.4081-01	2.8240+01	3.3739+01	5.4991+00	1.4360+02
82	2.9097-02	1.4206+00	2.7685+01	3.6088+01	8.4033+00	2.3998+02
83	2.7230-02	1.5935+00	2.5559+01	3.6227+01	1.0668+01	3.3325+02
84	2.1290-02	1.0247+00	1.9562+01	3.0969+01	1.1407+01	4.8767+02
85	2.1193-02	1.3706+00	1.8910+01	3.3365+01	1.4455+01	6.1740+02
86	3.4139-02	2.0205+00	2.3608+01	3.5582+01	1.1974+01	2.9157+02
87	3.9463-02	2.0950+00	2.5528+01	3.7561+01	1.2033+01	2.5184+02
88	3.1874-02	1.0844+00	3.6011+01	4.1551+01	5.5399+00	1.3978+02
89	3.2258-02	1.2969+00	3.0397+01	3.7185+01	6.7878+00	1.7022+02
90	3.2731-02	1.3333+00	2.9503+01	3.6654+01	7.1507+00	1.7773+02
91	2.9642-02	1.3129+00	2.9380+01	3.6800+01	7.4199+00	2.0602+02
92	2.9209-02	1.2756+00	2.6299+01	2.6897+01	5.9772-01	-2.3208+01

APPENDIX D

Calculation Procedures Used in Appendix C

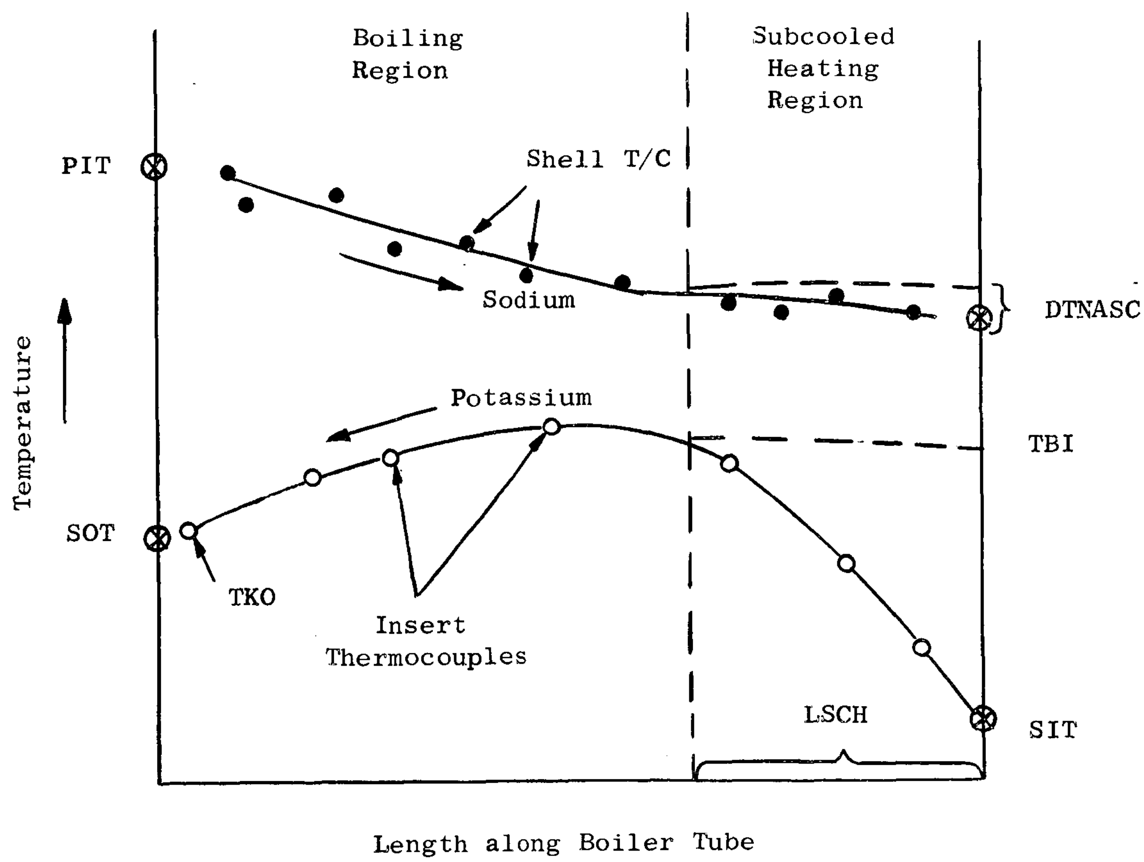
(Evaluation of 300 KW Data)

APPENDIX D

CALCULATIONAL PROCEDURES USED IN THE EVALUATION OF 300 KW DATA

The calculational procedures following are those employed to obtain the boiling heat transfer and pressure drop parameters presented in Table C-4 of Appendix C of this report. The nomenclature employed herein is the same as that for Table C-4 of Appendix C.

Sketch (a) below illustrates the basic data obtained in a typical run with the 2-inch pitch helical insert.



The potassium temperature profile in the runs with insert is determined directly as shown in the sketch by thermocouples positioned in the insert support tube. The sodium temperature profile is determined from the thermocouple positioned on the boiler shell. The temperature at which boiling initiates (TBI) and the length of boiler tube is subcooled heating (LSCH) are obtained from the potassium temperature profile as shown.

The heat transferred in the subcooled heating region (QSC) is obtained from the potassium temperature change in that region as follows:

$$QSC = (SFLO)\ (W_K)\ (TBI-SIT) \tag{1}$$

The sodium temperature change in the subcooled heating region (DTNASC) is obtained from QSC as follows:

$$DTNASC = \frac{QSC}{(PFLO)\ (C_{Na})} \tag{2}$$

The overall sodium to potassium temperature difference at the beginning of the boiling region (DTOBI) and at the end of the boiling region (DTOE) are given by Equations (3) and (4).

$$DTOBI = POT + DTNASC - TBI \tag{3}$$

$$DTOE = PIT - TKO \tag{4}$$

The sodium and potassium Peclet numbers (PE-NA and PE-K respectively) are calculated from equations (5) and (6) below.

$$PE\text{-}NA = \frac{D_{eq}\ (PFLO)\ C_{Na}}{(A_{Na})\quad k_{Na}} \tag{5}$$

$$PE\text{-}K = \frac{Di\quad (SFLO)\ C_k}{A_K\quad\quad k_K} \tag{6}$$

The sodium flow area (A_{Na}) is 2.57 square inches and the superficial potassium flow area (A_K) is 0.668 square inches for the data treated. The equivalent diameter of the sodium annulus (Deq) is 1.067-inch and the boiler tube internal diameter (Di) is 0.922-inch.

The potassium liquid Reynold's number (RE-KL) is calculated as follows:

$$\text{RE-KL} = \frac{\text{Di} \quad (\text{SFLO})}{A_k \ \mu_k} \tag{7}$$

The sodium heat transfer coefficient is computed from Equation (8) below, which was obtained experimentally from liquid-liquid runs as discussed in the 300 KW Data Evaluation section of this report.

$$h_{Na} = 0.6744 \left(\frac{D_{si}}{D_o} \right)^{0.3} \left[5 + 0.025 \ (\text{PE-NA}) \right]^{0.8} \tag{8}$$

The sodium heat transfer coefficient based upon the inner area of the boiler tube (H-NA) is obtained from h_{Na} and the ratio of boiler tube OD to ID (Do/Di) as follows:

$$\text{H-NA} = h_{Na} \quad (\text{Do/Di}) \tag{9}$$

The heat transfer coefficient of the boiler tube wall based upon the inner area of the boiler tube (H-BW) is obtained from the wall thermal conductivity (k_w) as follows:

$$\text{H-BW} = \frac{2 \ k_w}{D_i \log_e \left(\frac{D_o}{D_i} \right)} \tag{10}$$

The heat transfer area in boiling (A_B) based upon the tube ID is calculated from the total heat transfer length (91.45-inches for these tests) and LSCH as follows:

$$A_B = \frac{\pi\,(.922)}{144}\,(91.45 - \text{LSCH}) \tag{11}$$

The average boiling heat flux (Q/A - AB) is given by Equation (12).

$$\text{Q/A-AB} = \frac{\text{QPRI} - \text{QSC}}{A_B} \tag{12}$$

The arithmetic average (DTOBAA) and logarithmic average (DTOBLA) overall boiling temperature differences are given as follows:

$$\text{DTOBAA} = \frac{\text{DTOBI} + \text{DTOE}}{2.0} \tag{13}$$

$$\text{DTOBLA} = \frac{\text{DTOE} - \text{DTOBI}}{\log_e \left(\frac{\text{DTOE}}{\text{DTOBI}}\right)} \tag{14}$$

The overall boiling heat transfer coefficients based upon the arithmetic average and logarithmic average boiling temperature differences (UOB-AA and UOB-LA respectively) are given by Equations (15) and (16).

$$\text{UOB-AA} = \frac{\text{Q/A-AB}}{\text{DTOBAA}} \tag{15}$$

$$\text{UOB-LA} = \frac{\text{Q/A-AB}}{\text{DTOBLA}} \tag{16}$$

The average potassium heat transfer coefficients based upon the arithmetic and logarithmic average boiling temperature differences (HAK-AA and HAK-LA respectively) are obtained as follows:

$$\text{HAK-AA} = \left(\frac{1}{\text{UOB-AA}} - \frac{1}{\text{H-NA}} - \frac{1}{\text{H-BW}} \right)^{-1} \quad (17)$$

$$\text{HAK-LA} = \left(\frac{1}{\text{UOB-LA}} - \frac{1}{\text{H-NA}} - \frac{1}{\text{H-BW}} \right)^{-1} \quad (18)$$

The boiler inlet pressure tabulated in Table A-2 of Appendix A (BIP-C) has been corrected to the beginning of the heat transfer region for the pressure drop due to the head of liquid potassium above the pressure gage diaphragm. An additional correction for liquid potassium head in the subcooled heating region is applied to obtain the pressure at boiling initiation (BIP-BI) as follows. The small frictional pressure drop in the liquid potassium region is ignored.

$$\text{BIP-BI} = \text{BIP-C} - \frac{\rho_{KL}\ (\text{LSCH})}{1728} \quad (19)$$

The total two-phase pressure drop in the boiling region (DPB-G) is calculated as follows:

$$\text{DPB-G} = (\text{BIP-BI}) - (\text{BOP}) \quad (20)$$

The two-phase momentum pressure drop (DP-M) is calculated from Equation 26 of reference (Q6), using a slip ratio of 1.0. The equation employed is given following, where G-K is the potassium mass velocity as tabulated in Table I of this report.

$$\text{DP-M} = \left\{ \left[(1 - \text{QUAL}) \frac{\rho_{KV}}{\rho_{KL}} + \text{QUAL} \right] \frac{1}{\rho_{KV}} - \frac{1}{\rho_{KL}} \right\} \frac{(\text{G-K})^2}{g_o} \quad (21)$$

The total boiling frictional pressure drop (DPB-F) can now be obtained as follows, where the small correction due to two-phase elevation pressure drop is neglected.

$$DPB-F = (DPF\text{-}G) - (DP\text{-}M) \tag{22}$$

Single-phase (water) pressure drop data, reported in Reference (2), were obtained for the boiler tube with 2-inch pitch insert used in obtaining the boiling potassium data tabulated in this report. The water pressure drop data are adequately represented by Equation (23) following:

$$\Delta P_W = 0.02132 \left(\frac{N_{Re}}{1000}\right)^{1.587} \tag{23}$$

A procedure for calculating liquid potassium pressure drop from the measured water results is presented in Reference (2). Figure B of Reference (2) gives the ratio of liquid potassium pressure drop to water pressure drop $\left(\frac{\Delta P_{KL}}{\Delta P_W}\right)$ as a function of average potassium temperature. This ratio and the equation for the measured boiler tube can be used to calculate the liquid potassium pressure drop for the entire boiler tube length including both the heated and unheated lengths. The total tube length is 105.15-inches in these tests, and the heated length is 91.45-inches. The liquid potassium pressure drop across the boiling region (DP-KL) is therefore obtained as follows:

$$DP\text{-}KL = \frac{(91.45-LSCH)}{105.15} \left(\frac{\Delta P_{KL}}{\Delta P_W}\right) 0.02132 \left(\frac{RE\text{-}KL}{1000}\right)^{1.587} \tag{24}$$

The experimental two-phase frictional pressure drop multipliers are finally obtained as follows:

$$TPFM = \frac{DPB\text{-}F}{DP\text{-}KL} \tag{25}$$

APPENDIX E

100 KW Data

TABLE E-1

100 KW Loop Instrumentation

Beginning August 27, 1964

T/C No.	Location	Distance Inches
	Start of Heated Zone	15 1/4
20	Test Section Wall	19
21	Test Section Wall	22
22	Test Section Wall	25
23	Test Section Wall	28 1/8
24	Test Section Wall	31
25	Test Section Wall	33 7/8
26	Test Section Wall	36 7/8
27	Test Section Wall	39 13/16
31	Test Section Wall	43
32	Test Section Wall	43
	End of Heated Zone	45 1/4
33	Test Section Outlet Well	47
34	Test Section Outlet Well	47
35	Test Section Outlet Well	47

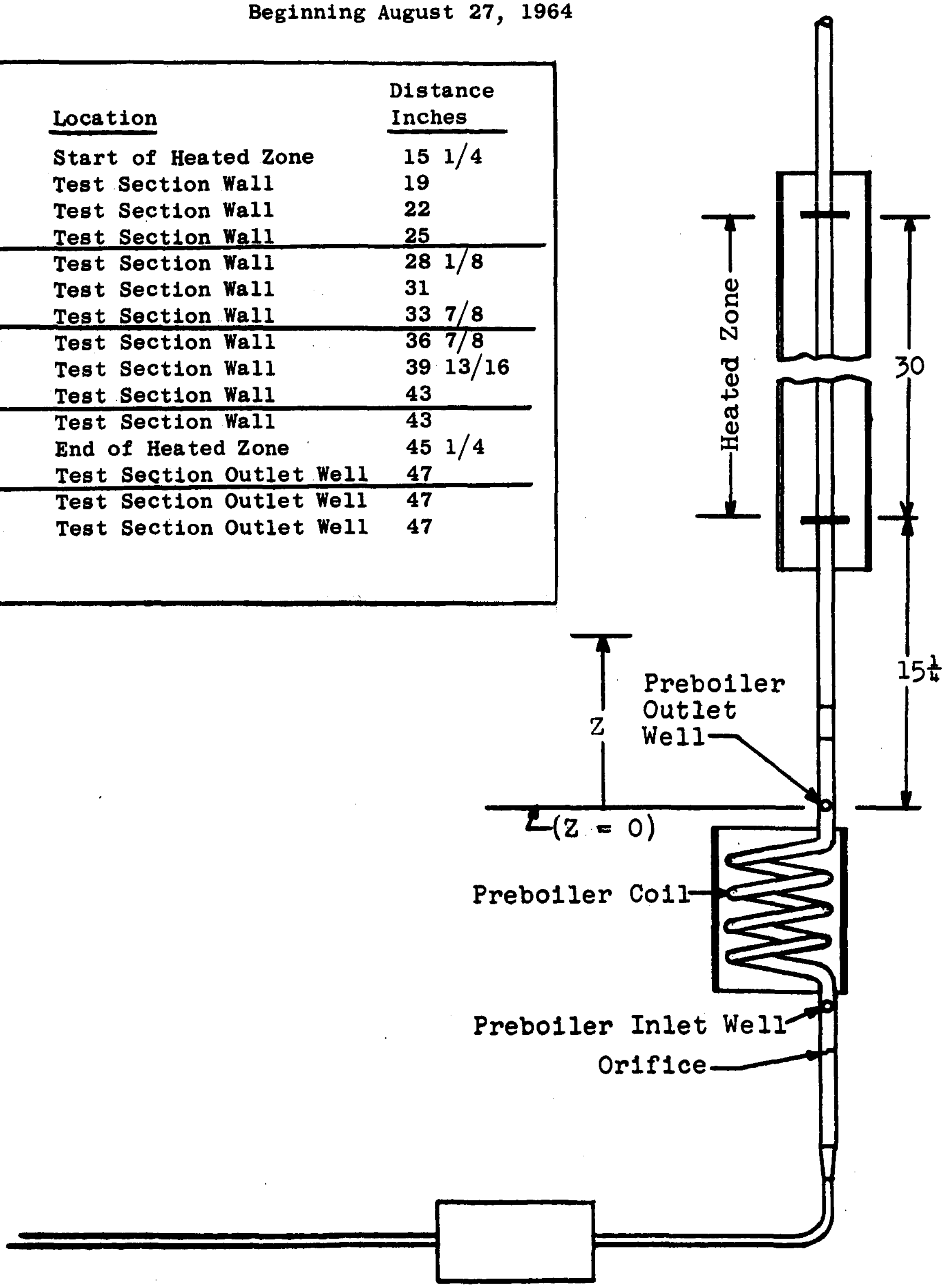


Table E-1

100 KW BOILING POTASSIUM DATA

Col. No.	Heading		Description
236	DATE	(e.g.,	8.2740+03 = 8/27/64)
237	TIME	(e.g.,	1.6200+03 = 1620)
274	TK FM		Fluid Temperature at Flowmeter, °F
282,290	TPB IN		Preboiler Inlet Temperature, °F
298-370	PBC N		Preboiler Coil Temperature, °F
378,387	TPBOUT		Preboiler Outlet Well Temperature, °F
396-414	TSTART		Unheated Starting Length Temperature, °F
423-504	TWO N		Test Section Outside Pipe Wall Temperature, °F
513-531	TTSOUT		Fluid Temperature at Test Section Outlet, °F
540	MAGNET		Flowmeter Magnet Temperature, °F
547-617	CND N		Condenser Temperature at N, °F
624-659	PBRADS		Preboiler Radiation, Shield Temperature, °F
666-687	TSRADS		Test Section Radiation Shield Temperature, °F
694	TSTART		Unheated Starting Length Temperature, °F
708,715	TSRADS		Test Section Radiation Shield Temperature, °F
774	QN PB		Net Preboiler Power, KW
780	QN TS		Net Test Section Power, KW
784	Q/A TS		T/S Heat Flux, Btu/hr-ft^2
802	FLOW		Flow Rate, lb/sec
805	G		Mass Velocity, lb/hr-ft^2
816	X PB		Preboiler Exit Quality
823	X TS		Test Section Exit Quality
825	ENTOUT		Mixture Enthalpy at T/S Outlet
828	VELOUT		Vapor Velocity, ft/sec
1010-1066	TWI N		Inside Wall Temperature at N, °F
1067	DT 31		(TWI 31) - (TTSOUT) Ave. at 31, °F
1068	H 31		$\frac{Q/A}{DT\ 31}$, Btu/hr-ft^2 °F
1073	TWI 32		Inside Wall Temperature at 32, °F
1074	DT 32		(TWI 32) - TTSOUT) Ave. at 32, °F
1075	H 32		$\frac{Q/A}{DT\ 32}$, Btu/hr-ft^2 °F

TABLE E-1

100 KW BOILING POTASSIUM DATA

	236	237	274	282	290	298
	DATE	TIME	TK FM	TPB IN	TPB IN	PBC 5
1	8.2740+03	1.6200+03	1.1122+03	1.0635+03	1.1102+03	1.5423+03
2	8.2740+03	2.1520+03	1.1341+03	1.0865+03	1.1313+03	1.5802+03
3	8.2840+03	2.4000+02	1.1413+03	1.0946+03	1.1384+03	1.5963+03
4	8.2840+03	5.3000+02	1.2374+03	1.2349+03	1.2349+03	1.8495+03
5	8.2840+03	1.0050+03	1.2290+03	1.2269+03	1.2270+03	1.8313+03
6	8.2840+03	1.3140+03	1.2396+03	1.2373+03	1.2373+03	1.8594+03
7	8.2840+03	1.4300+03	1.2636+03	1.2617+03	1.2618+03	1.8097+03
8	8.3140+03	4.5500+02	1.1306+03	1.0826+03	1.1282+03	1.5714+03
9	8.3140+03	1.0370+03	1.1401+03	1.1355+03	1.1355+03	1.5681+03
10	8.3140+03	1.2190+03	1.1536+03	1.1510+03	1.1510+03	1.6215+03
11	9.1140+03	1.8150+03	1.1085+03	1.1381+03	1.1512+03	1.3385+03
12	9.1140+03	2.0300+03	1.1477+03	1.1581+03	1.1919+03	1.5808+03
13	9.1140+03	2.2300+03	1.1779+03	1.3555+03	1.3489+03	1.7013+03
14	9.1240+03	9.2300+02	1.1129+03	1.1563+03	1.1563+03	1.4686+03
15	9.1240+03	1.1060+03	1.1211+03	1.1653+03	1.1652+03	1.5303+03
16	9.1240+03	1.3180+03	1.1702+03	1.2122+03	1.2121+03	1.7595+03
17	9.1240+03	1.4480+03	1.1790+03	1.2217+03	1.2223+03	1.7888+03
18	9.1240+03	1.6000+03	1.1998+03	1.2149+03	1.2175+03	1.7836+03
19	9.1240+03	1.8000+03	1.2115+03	1.2236+03	1.2291+03	1.7658+03
20	9.1240+03	1.9300+03	1.2391+03	1.2620+03	1.2555+03	1.7683+03
21	9.1240+03	2.3300+03	1.2406+03	1.3380+03	1.3194+03	1.7681+03
22	9.1340+03	2.4000+02	1.2763+03	1.4285+03	1.3974+03	1.7700+03
23	9.1340+03	4.4500+02	1.2894+03	1.5106+03	1.4638+03	1.7977+03

100 KW BOILING POTASSIUM DATA

	306	314	322	330	338	346
	PBC 6	PBC 7	PBC 8	PBC 9	PBC 10	PBC 11
1	1.6318+03	1.6817+03		1.7920+03	1.8311+03	1.8522+03
2	1.6710+03	1.7209+03		1.8294+03	1.8692+03	1.8891+03
3	1.6881+03	1.7382+03		1.8463+03	1.8849+03	1.7961+03
4	1.8137+03	1.8084+03		1.8144+03	1.8117+03	1.8056+03
5	1.8124+03	1.8073+03		1.8136+03	1.8092+03	1.8041+03
6	1.8134+03	1.8102+03		1.8162+03	1.8112+03	1.8063+03
7	1.8152+03	1.8127+03		1.8185+03	1.8131+03	1.8080+03
8	1.6615+03	1.7127+03		1.8174+03	1.8539+03	1.8740+03
9	1.6566+03	1.7077+03		1.8135+03	1.8510+03	1.8713+03
10	1.7154+03	1.7677+03		1.8731+03	1.9092+03	1.8340+03
11	1.3826+03	1.4074+03		1.4637+03	1.4873+03	1.5007+03
12	1.6599+03	1.7023+03		1.7939+03	1.8305+03	1.8443+03
13	1.7647+03	1.7979+03		1.8701+03	1.8992+03	1.9079+03
14	1.5339+03	1.5711+03		1.6550+03	1.6887+03	1.7047+03
15	1.6051+03	1.6472+03		1.7388+03	1.7750+03	1.7898+03
16	1.7725+03	1.7635+03		1.7705+03	1.7680+03	1.7607+03
17	1.7675+03	1.7668+03		1.7733+03	1.7668+03	1.7628+03
18	1.7707+03	1.7686+03		1.7755+03	1.7699+03	1.7651+03
19	1.7684+03	1.7672+03		1.7749+03	1.7675+03	1.7639+03
20	1.7700+03	1.7714+03		1.7781+03	1.7697+03	1.7656+03
21	1.7708+03	1.7728+03		1.7787+03	1.7696+03	1.7667+03
22	1.7717+03	1.7717+03		1.7793+03	1.7706+03	1.7679+03
23	1.7799+03	1.7748+03		1.7810+03	1.7714+03	1.7693+03

100 KW BOILING POTASSIUM DATA

	354	362	370	378	387	396
	PBC 12	PBC 13	PBC 14	TPBOUT	TPBOUT	TSTART
1	1.8386+03	1.8641+03		1.8195+03	1.8032+03	1.7838+03
2	1.8760+03	1.8089+03		1.7772+03	1.7909+03	1.7842+03
3	1.7939+03	1.7998+03		1.7754+03	1.7891+03	1.7824+03
4	1.8009+03	1.8076+03		1.7812+03	1.7939+03	1.7884+03
5	1.7985+03	1.8067+03		1.7796+03	1.7924+03	1.7858+03
6	1.8002+03	1.8089+03		1.7806+03	1.7937+03	1.7879+03
7	1.8015+03	1.8103+03		1.7811+03	1.7940+03	1.7875+03
8	1.8617+03	1.8852+03		1.7806+03	1.7915+03	1.7875+03
9	1.8579+03	1.8821+03		1.8611+03	1.8732+03	1.8541+03
10	1.8304+03	1.8358+03		1.8132+03	1.8231+03	1.8196+03
11	1.4931+03	1.5073+03		1.4918+03	1.4992+03	1.4971+03
12	1.8319+03	1.8530+03	1.8508+03	1.8361+03	1.8452+03	1.8311+03
13	1.8964+03	1.9132+03		1.7839+03	1.7948+03	1.7908+03
14	1.6940+03	1.7123+03		1.6967+03	1.7056+03	1.6933+03
15	1.7783+03	1.7980+03		1.7821+03	1.7933+03	1.7775+03
16	1.7544+03	1.7606+03		1.7350+03	1.7434+03	1.7432+03
17	1.7560+03	1.7624+03		1.7360+03	1.7453+03	1.7441+03
18	1.7584+03	1.7650+03	1.7639+03	1.7379+03	1.7484+03	1.7462+03
19	1.7570+03	1.7644+03	1.7617+03	1.7366+03	1.7477+03	1.7442+03
20	1.7584+03	1.7673+03		1.7385+03	1.7500+03	1.7459+03
21	1.7593+03	1.7680+03	1.7670+03	1.7385+03	1.7511+03	1.7453+03
22	1.7608+03	1.7680+03		1.7392+03	1.7497+03	1.7461+03
23	1.7616+03	1.7695+03		1.7399+03	1.7510+03	1.7469+03

100 KW BOILING POTASSIUM DATA

	405 TSTART	414 TSTART	423 TWO 20	432 TWO 21	441 TWO 22	450 TWO 23
1	1.7735+03	1.7538+03	1.8077+03	1.8076+03	1.8097+03	1.8105+03
2	1.7726+03	1.7535+03	1.8061+03	1.8068+03	1.8095+03	1.8093+03
3	1.7711+03	1.7529+03	1.8063+03	1.8053+03	1.8078+03	1.8092+03
4	1.7774+03	1.7610+03	1.8094+03	1.8111+03	1.8137+03	1.8138+03
5	1.7744+03	1.7583+03	1.8063+03	1.8080+03	1.8104+03	1.8105+03
6	1.7773+03	1.7600+03	1.8086+03	1.8104+03		1.8138+03
7	1.7761+03	1.7594+03	1.8073+03	1.8093+03		1.8127+03
8	1.7768+03	1.7604+03	1.8200+03	1.8203+03		1.8230+03
9	1.8453+03	1.8249+03	1.8567+03	1.8568+03		1.8570+03
10	1.8078+03	1.7913+03	1.8531+03	1.8554+03		1.8566+03
11	1.4903+03	1.4672+03	1.6848+03	1.7628+03	1.8742+03	1.8937+03
12	1.8238+03	1.6918+03	1.8325+03	1.8306+03	1.8702+03	1.8318+03
13	1.7801+03	1.7619+03	1.8295+03	1.8296+03		1.8264+03
14	1.6834+03	1.6649+03	1.7820+03			1.7780+03
15	1.7676+03	1.7497+03	1.7806+03			1.7799+03
16	1.7327+03	1.7179+03	1.7693+03			1.7682+03
17	1.7330+03	1.7187+03	1.7694+03			1.7691+03
18	1.7354+03	1.7207+03	1.7712+03			1.7722+03
19	1.7334+03	1.7187+03	1.7687+03			1.7694+03
20	1.7351+03	1.7206+03	1.7707+03			1.7715+03
21	1.7343+03	1.7194+03	1.7695+03			1.7700+03
22	1.7346+03	1.7191+03	1.7703+03			1.7706+03
23	1.7356+03	1.7211+03	1.7707+03			1.7710+03

100 KW BOILING POTASSIUM DATA

	459	468	477	486	495	504
	TWO 24	TWO 25	TWO 26	TWO 27	TWO 31	TWO 32
1	1.8066+03	1.8127+03	1.8117+03	1.8098+03	1.8098+03	1.8085+03
2	1.8074+03	1.8126+03	1.8107+03	1.8077+03	1.8104+03	1.8093+03
3	1.8055+03	1.8113+03	1.8099+03	1.8065+03	1.8084+03	1.8076+03
4	1.8111+03	1.8161+03	1.8147+03	1.8116+03	1.8127+03	1.8131+03
5	1.8077+03	1.8127+03	1.8110+03	1.8089+03	1.8104+03	1.8099+03
6	1.8106+03	1.8148+03	1.8136+03	1.8106+03	1.8124+03	1.8113+03
7	1.8101+03	2.3698+03	1.8130+03	1.8101+03	1.8120+03	1.8113+03
8	1.8195+03	1.8234+03	1.8222+03	1.8178+03	1.8194+03	1.8175+03
9	1.8525+03			1.8508+03	1.8509+03	1.8490+03
10	1.8522+03			1.8512+03	1.8510+03	1.8494+03
11	1.8260+03	1.8268+03	1.8932+03	1.8246+03	1.8233+03	1.8214+03
12	1.8270+03	1.8261+03	1.9217+03	1.8236+03	1.8219+03	1.8202+03
13	1.8261+03		1.9274+03	1.8217+03	1.8205+03	1.8188+03
14	1.7712+03			1.7749+03	1.7736+03	1.7713+03
15	1.8633+03				1.7765+03	1.7747+03
16	1.7662+03			1.7658+03	1.7663+03	1.7657+03
17	1.7666+03			1.7669+03	1.7669+03	1.7661+03
18	1.7685+03		1.8464+03	1.7684+03	1.7689+03	1.7680+03
19	1.7674+03		1.8445+03	1.7667+03	1.7680+03	1.7661+03
20	1.7689+03		1.8473+03	1.7690+03	1.7688+03	1.7676+03
21	1.7681+03		1.8422+03	1.7671+03	1.7675+03	1.7668+03
22	1.7685+03		1.8430+03	1.7688+03	1.7686+03	1.7678+03
23	1.7699+03		1.8370+03	1.7697+03	1.7692+03	1.7683+03

100 KW BOILING POTASSIUM DATA

	513 TTSOUT	522 TTSOUT	531 TTSOUT	540 MAGNET	547 CND 37	554 CND 38
1	1.7899+03	1.7924+03	1.7885+03	5.5970+02	1.7992+03	1.7804+03
2	1.7921+03	1.7949+03	1.7901+03	5.7369+02	1.8002+03	1.7799+03
3	1.7910+03	1.7933+03	1.7887+03	5.7496+02	1.7984+03	1.7779+03
4	1.7956+03	1.7979+03	1.7938+03	6.2869+02	1.8022+03	1.7770+03
5	1.7936+03	1.7958+03	1.7917+03	6.3047+02	1.7990+03	1.7730+03
6	1.7955+03	1.7972+03	1.7929+03	6.3698+02	1.8010+03	1.7726+03
7	1.7957+03	1.7969+03	1.7951+03	6.4733+02	1.8007+03	1.7707+03
8	1.7943+03	1.7961+03	1.8001+03	5.8257+02	1.8118+03	1.7719+03
9	1.8260+03	1.8286+03	1.8242+03	5.8349+02	1.8341+03	1.8061+03
10	1.8268+03	1.8300+03	1.8255+03	5.9226+02	1.8336+03	1.8055+03
11	1.7980+03	1.8021+03	1.7983+03	5.3396+02	1.8059+03	1.7853+03
12	1.7976+03	1.8005+03	1.7967+03	5.8629+02	1.8047+03	1.7793+03
13	1.7956+03	1.7994+03	1.7958+03	6.1757+02	1.8014+03	1.7749+03
14	1.7490+03	1.7524+03	1.7478+03	5.7470+02	1.7549+03	1.7275+03
15	1.7728+03	1.7428+03	1.7550+03	5.7929+02	1.7559+03	1.7288+03
16	1.7497+03	1.7530+03	1.7496+03	6.0041+02	1.7547+03	1.7279+03
17	1.7512+03	1.7542+03	1.7542+03	6.0908+02	1.7556+03	1.7281+03
18	1.7530+03	1.7566+03	1.7528+03	6.1603+02	1.7577+03	1.7301+03
19	1.7513+03	1.7547+03	1.7501+03	6.2380+02	1.7559+03	1.7276+03
20	1.7518+03	1.7558+03	1.7520+03	6.3167+02	1.7581+03	1.7291+03
21	1.7526+03	1.7557+03	1.7521+03	6.4178+02	1.7581+03	1.7280+03
22	1.7533+03	1.7568+03	1.7530+03	6.5561+02	1.7596+03	1.7289+03
23	1.7535+03	1.7572+03	1.7537+03	6.6330+02	1.7602+03	1.7293+03

100 KW BOILING POTASSIUM DATA

	561	568	575	582	589	596
	CND 39	CND 40	CND 41	CND 42	CND 43	CND 44
1	1.7817+03	1.7088+03	1.5681+03	1.4592+03	1.3718+03	1.3014+03
2	1.7827+03	1.7445+03	1.6082+03	1.4926+03	1.4031+03	1.3292+03
3	1.7812+03	1.7661+03	1.6258+03	1.5074+03	1.4155+03	1.3405+03
4	1.7851+03	1.7839+03	1.7826+03	1.7880+03	1.7789+03	1.6318+03
5	1.7820+03	1.7812+03	1.7789+03	1.7853+03	1.7849+03	1.6677+03
6	1.7834+03	1.7821+03	1.7799+03	1.7865+03	1.7861+03	1.7732+03
7	1.7819+03	1.7814+03	1.7783+03	1.7862+03	1.7856+03	1.7840+03
8	1.7827+03	1.7817+03	1.7800+03	1.6601+03	1.5250+03	1.4215+03
9	1.8160+03	1.8158+03	1.7445+03	1.5936+03	1.4770+03	1.3872+03
10	1.8158+03	1.8159+03	1.8137+03	1.6678+03	1.5354+03	1.4343+03
11	1.7184+03	1.5714+03	1.4725+03	1.3843+03	1.3128+03	1.2512+03
12	1.7869+03	1.7868+03	1.7661+03	1.6100+03	1.4918+03	1.3990+03
13	1.7840+03	1.7840+03	1.7840+03	1.6563+03	1.5305+03	1.4360+03
14	1.7377+03	1.7382+03	1.6594+03	1.5258+03	1.4235+03	1.3414+03
15	1.7387+03	1.7391+03	1.7158+03	1.5730+03	1.4596+03	1.3698+03
16	1.7379+03	1.7391+03	1.7364+03	1.7413+03	1.6316+03	1.5057+03
17	1.7389+03	1.7387+03	1.7375+03	1.7426+03	1.6892+03	1.5464+03
18	1.7412+03	1.7405+03	1.7395+03	1.7452+03	1.7445+03	1.6562+03
19	1.7390+03	1.7385+03	1.7375+03	1.7426+03	1.7425+03	1.7249+03
20	1.7406+03	1.7402+03	1.7389+03	1.7441+03	1.7439+03	1.7430+03
21	1.7398+03	1.7397+03	1.7381+03	1.7445+03	1.7439+03	1.7425+03
22	1.7423+03	1.7411+03	1.7398+03	1.7462+03	1.7454+03	1.7441+03
23	1.7423+03	1.7409+03	1.7395+03	1.7481+03	1.7457+03	1.7443+03

100 KW BOILING POTASSIUM DATA

	603	610	617	624	631	638
	CND 45	CND 46	CND 47	PBRADS	PBRADS	PBRADS
1	1.2463+03	1.1929+03	1.1508+03	7.8051+02	8.1229+02	7.7180+02
2	1.2718+03	1.2178+03	1.1719+03	7.9582+02	8.2759+02	7.6064+02
3	1.2815+03	1.2255+03	1.1803+03	8.0042+02	8.3121+02	7.6505+02
4	1.5209+03	1.4263+03	1.3535+03	8.8893+02	9.1447+02	8.5486+02
5	1.5472+03	1.4447+03	1.3663+03	8.9356+02	9.1825+02	8.5918+02
6	1.6311+03	1.5038+03	1.4138+03	9.0907+02	9.3306+02	8.7381+02
7	1.7079+03	1.5621+03	1.4591+03	9.2019+02	9.4309+02	8.8402+02
8	1.3470+03	1.2779+03	1.2222+03	7.9593+02	8.3031+02	7.8443+02
9	1.3210+03	1.2576+03	1.2069+03	7.9426+02	8.2810+02	7.8510+02
10	1.3595+03	1.2909+03	1.2366+03	8.1227+02	8.4509+02	7.7342+02
11	1.2027+03	1.1574+03	1.1191+03	7.0072+02	7.3188+02	6.9290+02
12	1.3296+03	1.2652+03	1.2143+03	8.0689+02	8.4177+02	7.6422+02
13	1.3626+03	1.2962+03	1.2431+03	8.2886+02	8.6289+02	7.9473+02
14	1.2786+03	1.2183+03	1.1708+03	7.6556+02	8.0674+02	7.5417+02
15	1.3022+03	1.2385+03	1.1887+03	7.8762+02	8.3311+02	7.7452+02
16	1.4171+03	1.3364+03	1.2742+03	8.5659+02	9.0169+02	8.4605+02
17	1.4489+03	1.3608+03	1.2947+03	8.6598+02	9.0994+02	8.5621+02
18	1.5332+03	1.4286+03	1.3494+03	8.8479+02	9.0412+02	7.7109+02
19	1.5908+03	1.4720+03	1.3858+03	8.9595+02	9.1099+02	8.6700+02
20	1.6674+03	1.5279+03	1.4303+03	9.0830+02	9.2285+02	8.7727+02
21	1.7081+03	1.5544+03	1.4489+03	9.1332+02	9.4549+02	8.8578+02
22	1.7430+03	1.5942+03	1.4797+03	9.2051+02	9.4466+02	8.9297+02
23	1.7433+03	1.6487+03	1.5213+03	9.2793+02	9.4678+02	9.0116+02

100 KW BOILING POTASSIUM DATA

	645 PBRADS	652 PBRADS	659 PBRADS	666 TSRADS	673 TSRADS	680 TSRADS
1	7.3385+02	7.4712+02	7.7689+02	9.4690+02	9.4165+02	9.7140+02
2	7.4941+02	7.6251+02	7.9160+02	9.4880+02	9.4273+02	9.7418+02
3	7.5392+02	7.6686+02	7.9581+02	9.4747+02	9.4102+02	9.7224+02
4	8.3867+02	8.5654+02	8.7463+02	9.6310+02	9.5898+02	9.9393+02
5	8.4345+02	8.6117+02	8.7989+02	9.6156+02	9.5433+02	9.9094+02
6	8.5522+02	8.7557+02	8.9171+02	9.6248+02	9.5502+02	9.9229+02
7	8.6458+02	8.8602+02	9.0029+02	9.6282+02	9.5505+02	9.9324+02
8	7.4061+02	7.5518+02	7.8474+02	1.0315+03	1.0245+03	1.0635+03
9	7.4309+02	7.5648+02	7.8859+02	1.0559+03	1.0481+03	1.0782+03
10	7.6144+02	7.7521+02	8.0616+02	1.0578+03	1.0501+03	1.0811+03
11	6.4385+02	6.5473+02	6.7987+02	1.0041+03	9.9707+02	1.0212+03
12	7.5905+02	7.6583+02	8.0136+02	1.0420+03	1.0359+03	1.0641+03
13	7.8645+02	7.9665+02	8.2695+02	1.0594+03	1.0532+03	1.0824+03
14	7.1912+02	7.2581+02	7.6054+02	1.0552+03	1.0436+03	1.0824+03
15	7.4288+02	7.4943+02	7.8571+02	1.0506+03	1.0391+03	1.0783+03
16	8.1643+02	8.3105+02	8.5468+02	9.7124+02	9.6199+02	9.9342+02
17	8.2597+02	8.4122+02	8.6369+02	9.7266+02	9.6260+02	9.9540+02
18	8.4127+02	8.5725+02	8.7924+02	9.7781+02	9.6777+02	1.0005+03
19	8.5112+02	8.6896+02	8.8880+02	9.7595+02	9.6554+02	9.9995+02
20	8.6043+02	8.7936+02	8.9738+02	9.7989+02	9.6961+02	1.0043+03
21	8.6619+02	8.8792+02	9.0097+02	9.6670+02	9.5639+02	9.9124+02
22	8.7188+02	8.9513+02	9.0509+02	9.6650+02	9.5601+02	9.8959+02
23	8.7780+02	9.0331+02	9.1010+02	9.6235+02	9.5136+02	9.8482+02

100 KW BOILING POTASSIUM DATA

	687	694	708	715	774	780
	TSRADS	TSTART	TSRADS	TSRADS	QN PB	QN TS
1	9.5267+02		9.7896+02	9.7799+02	6.3870+00	4.8654+00
2	9.5522+02		9.8109+02	9.8042+02	7.1066+00	4.3068+00
3	9.5343+02		9.8004+02	9.7900+02	7.4197+00	4.7957+00
4	9.7525+02		1.0028+03	1.0035+03	1.1521+01	4.3812+00
5	9.7205+02		1.0015+03	1.0020+03	1.2010+01	4.5701+00
6	9.7363+02		1.0036+03	1.0039+03	1.3015+01	4.4576+00
7	9.7363+02		1.0059+03	1.0067+03	1.3644+01	4.3800+00
8	1.0467+03		1.0629+03	1.0603+03	6.1384+00	8.4007+00
9	1.0631+03		1.0742+03	1.0765+03	6.2034+00	8.0847+00
10	1.0656+03		1.0780+03	1.0800+03	6.9956+00	8.3349+00
11	1.0946+03	1.1563+03	1.0095+03	1.0073+03	2.8820+00	7.3239+00
12	1.0446+03	1.2002+03	1.0598+03	1.0591+03	5.5699+00	8.2062+00
13	1.1973+03	1.3625+03	1.0722+03	1.0718+03	4.8350+00	7.7724+00
14	1.0828+03	1.1638+03	1.0689+03	1.0663+03	4.4142+00	8.0741+00
15	1.0787+03	1.1735+03	1.0663+03	1.0636+03	5.1386+00	8.0815+00
16	9.9384+02	1.2214+03	9.9172+02	9.9685+02	9.8355+00	4.5036+00
17	9.9586+02	1.2289+03	9.9379+02	9.9801+02	1.0352+01	4.4194+00
18	1.0010+03	1.2252+03	1.0001+03	1.0045+03	1.1833+01	4.5422+00
19	1.0004+03	1.2377+03	9.9958+02	1.0039+03	1.2357+01	4.5587+00
20	1.0048+03	1.2614+03	1.0045+03	1.0086+03	1.3050+01	4.5501+00
21	9.9175+02	1.3373+03	9.9278+02	9.9673+02	1.2920+01	4.3877+00
22	9.9011+02	1.4151+03	9.9226+02	9.9750+02	1.2846+01	4.3971+00
23	9.8534+02	1.4820+03	9.8818+02	9.9399+02	1.2875+01	4.4645+00

100 KW BOILING POTASSIUM DATA

	784	802	805	816	823	825
	Q/A TS	FLOW	G	X PB	X TS	ENTOUT
1	3.3075+04	3.9872-02	4.4716+04	8.0053-03	1.6893-01	5.5927+02
2	2.9277+04	4.0235-02	4.5123+04	4.2263-02	1.7580-01	5.6477+02
3	3.2601+04	3.9713-02	4.4538+04	5.7567-02	2.0837-01	5.8887+02
4	2.9783+04	3.9369-02	4.4152+04	2.2002-01	3.5973-01	7.0252+02
5	3.1068+04	3.7733-02	4.2317+04	2.5077-01	4.0305-01	7.3461+02
6	3.0302+04	3.6980-02	4.1473+04	2.9583-01	4.4753-01	7.6795+02
7	2.9775+04	3.7091-02	4.1597+04	3.2217-01	4.7084-01	7.8539+02
8	5.7108+04	3.7067-02	4.1571+04	2.6869-02	3.1194-01	6.6701+02
9	5.4959+04	3.7618-02	4.2188+04	9.6348-03	2.9843-01	6.6088+02
10	5.6661+04	3.7413-02	4.1958+04	5.6605-02	3.4071-01	6.9218+02
11	4.9788+04	4.1067-02	4.6057+04	-2.0988-03	1.3843-01	5.3814+02
12	5.5786+04	3.8179-02	4.2818+04	3.3516-03	2.8930-01	6.5033+02
13	5.2837+04	3.9202-02	4.3965+04	3.5317-02	2.8527-01	6.4714+02
14	5.4888+04	3.7541-02	4.2102+04	3.4326-03	2.5821-01	6.2010+02
15	5.4938+04	3.7576-02	4.2142+04	4.8740-03	2.8305-01	6.3995+02
16	3.0615+04	3.7740-02	4.2325+04	1.8448-01	3.3097-01	6.7547+02
17	3.0043+04	3.7528-02	4.2088+04	2.0556-01	3.5011-01	6.9029+02
18	3.0878+04	3.7310-02	4.1843+04	2.5503-01	4.0515-01	7.3211+02
19	3.0990+04	3.7112-02	4.1621+04	2.7743-01	4.2909-01	7.5006+02
20	3.0931+04	3.7219-02	4.1741+04	3.0720-01	4.5847-01	7.7245+02
21	2.9828+04	3.7012-02	4.1509+04	3.2293-01	4.6970-01	7.8098+02
22	2.9892+04	3.7438-02	4.1986+04	3.3730-01	4.8259-01	7.9083+02
23	3.0350+04	3.6962-02	4.1453+04	3.6316-01	5.1283-01	8.1378+02

100 KW BOILING POTASSIUM DATA

	828	1010	1017	1024	1031	1038
	VELOUT	TWI 20	TWI 21	TWI 22	TWI 23	TWI 24
1	1.3516+01	1.7978+03	1.7978+03	1.7998+03	1.8007+03	1.7967+03
2	1.4090+01	1.7974+03	1.7981+03	1.8008+03	1.8005+03	1.7987+03
3	1.6564+01	1.7965+03	1.7956+03	1.7981+03	1.7995+03	1.7958+03
4	2.7883+01	1.8005+03	1.8022+03	1.8049+03	1.8049+03	1.8022+03
5	3.0155+01	1.7970+03	1.7988+03	1.8012+03	1.8013+03	1.7984+03
6	3.2645+01	1.7996+03	1.8014+03		1.8047+03	1.8016+03
7	3.4369+01	1.7984+03	1.8005+03		1.8038+03	1.8012+03
8	2.2683+01	1.8030+03	1.8033+03		1.8060+03	1.8025+03
9	2.0008+01	1.8404+03	1.8405+03		1.8407+03	1.8362+03
10	2.2636+01	1.8363+03	1.8386+03		1.8397+03	1.8354+03
11	1.1053+01	1.6699+03	1.7479+03	1.8595+03	1.8789+03	1.8112+03
12	2.1560+01	1.8159+03	1.8140+03	1.8537+03	1.8152+03	1.8104+03
13	2.1931+01	1.8138+03	1.8139+03		1.8107+03	1.8104+03
14	2.2662+01	1.7656+03			1.7616+03	1.7548+03
15	2.4164+01	1.7642+03			1.7635+03	1.8470+03
16	2.9081+01	1.7601+03			1.7590+03	1.7570+03
17	3.0291+01	1.7604+03			1.7601+03	1.7576+03
18	3.4721+01	1.7620+03			1.7629+03	1.7593+03
19	3.6889+01	1.7594+03			1.7601+03	1.7581+03
20	3.9340+01	1.7614+03			1.7623+03	1.7597+03
21	4.0039+01	1.7606+03			1.7611+03	1.7591+03
22	4.1458+01	1.7613+03			1.7617+03	1.7595+03
23	4.3421+01	1.7617+03			1.7620+03	1.7609+03

100 KW BOILING POTASSIUM DATA

	1045	1052	1059	1066	1067	1068
	TWI 25	TWI 26	TWI 27	TWI 31	DT 31	H 31
1	1.8029+03	1.8019+03	1.7999+03	1.7999+03	9.6661+00	3.4217+03
2	1.8039+03	1.8020+03	1.7990+03	1.8017+03	9.2851+00	3.1532+03
3	1.8016+03	1.8002+03	1.7968+03	1.7986+03	7.6591+00	4.2566+03
4	1.8072+03	1.8059+03	1.8027+03	1.8039+03	8.1062+00	3.6742+03
5	1.8034+03	1.8017+03	1.7996+03	1.8011+03	7.4419+00	4.1747+03
6	1.8057+03	1.8046+03	1.8016+03	1.8034+03	8.1608+00	3.7132+03
7	2.3612+03	1.8041+03	1.8012+03	1.8031+03	7.2425+00	4.1112+03
8	1.8064+03	1.8052+03	1.8008+03	1.8024+03	5.5968+00	1.0204+04
9			1.8344+03	1.8346+03	8.3369+00	6.5923+03
10			1.8343+03	1.8342+03	6.7464+00	8.3987+03
11	1.8120+03	1.8785+03	1.8097+03	1.8085+03	9.0196+00	5.5199+03
12	1.8095+03	1.9052+03	1.8070+03	1.8053+03	7.0669+00	7.8939+03
13		1.9117+03	1.8059+03	1.8048+03	7.8484+00	6.7322+03
14			1.7585+03	1.7572+03	7.4271+00	7.3902+03
15				1.7601+03	3.1699+00	1.7331+04
16			1.7566+03	1.7571+03	6.3438+00	4.8260+03
17			1.7579+03	1.7579+03	4.6938+00	6.4006+03
18		1.8372+03	1.7592+03	1.7597+03	5.5833+00	5.5304+03
19		1.8353+03	1.7574+03	1.7587+03	6.7181+00	4.6129+03
20		1.8381+03	1.7597+03	1.7595+03	6.3183+00	4.8955+03
21		1.8334+03	1.7581+03	1.7586+03	5.1487+00	5.7933+03
22		1.8341+03	1.7599+03	1.7597+03	5.3247+00	5.6138+03
23		1.8280+03	1.7606+03	1.7601+03	5.2838+00	5.7440+03

100 KW BOILING POTASSIUM DATA

	1073	1074	1075
	TWI 32	DT 32	H 32
1	1.7986+03	8.3668+00	3.9531+03
2	1.8005+03	8.1491+00	3.5927+03
3	1.7979+03	6.9245+00	4.7081+03
4	1.8042+03	8.4859+00	3.5097+03
5	1.8006+03	6.8926+00	4.5074+03
6	1.8023+03	7.0435+00	4.3022+03
7	1.8025+03	6.5902+00	4.5181+03
8	1.8005+03	3.6915+00	1.5470+04
9	1.8326+03	6.3403+00	8.6682+03
10	1.8326+03	5.1118+00	1.1084+04
11	1.8065+03	7.0784+00	7.0338+03
12	1.8036+03	5.2896+00	1.0546+04
13	1.8031+03	6.1931+00	8.5315+03
14	1.7549+03	5.2071+00	1.0541+04
15	1.7583+03	1.3900+00	3.9523+04
16	1.7566+03	5.8023+00	5.2764+03
17	1.7571+03	3.8831+00	7.7369+03
18	1.7588+03	4.6861+00	6.5892+03
19	1.7568+03	4.7923+00	6.4667+03
20	1.7584+03	5.1614+00	5.9929+03
21	1.7579+03	4.4187+00	6.7503+03
22	1.7588+03	4.4754+00	6.6791+03
23	1.7593+03	4.4473+00	6.8243+03

TABLE E-2 100 KW LIQUID SODIUM DATA

Date Time	1/9/63 2330	1/10/63 0613	1/10/63 0955	1/10/63 2318	1/11/63 0253	1/11/63 0945	1/11/63 1450
T/C 5, ^{o}F	1133	1214	1180	1067	1004	1077	853
T/C 6, ^{o}F	1280	1335	1269	1204	1092	1146	891
T/C 8, ^{o}F	1382	1410	1318	1301	1154	1188	926
T/C 10, ^{o}F	1514	1491	1378	1435	1235	1237	960
T/C 11, ^{o}F	1615	1556	1422	1531	1301	1281	996
T/C 12, ^{o}F	1725	1629	1482		1383	1333	1037
T/C 13, ^{o}F	1767	1659	1503	1691	1405	1351	1048
T/C 15, ^{o}F	1720	1606	1458	1649	1375	1315	1031
T/C 16, ^{o}F	1720	1606	1459	1649	1378	1317	1034
T_L @ 10 = Fluid Temp. @ T/C 10	1426	1407	1315	1357	1187	1192	939
ΔT_f @ 10 = Wall Temp. - Fluid Temp.	39	34	23	37	19	15	8
New Power, Btu/sec.	15.2	15.39	12.08	12.50	8.79	8.98	3.73
q/A x 10^{-5} = Test Section Heat Flux	1.98	2.00	1.57	1.63	1.14	1.168	0.487
h @ 10 = Heat Transfer Coefficient at T/C 10	5,070	5,890	6,830	4,410	6,000	7,720	6,000
N_{Nu} = Nusselt Number at T/C 10	5.66	6.55	7.28	4.77	5.93	7.65	5.43
W = Flow rate, lbs/sec	0.08	0.121	0.133	0.068	0.074	0.117	0.066
N_{Pe} = Peclet Number	103	152	184	84	84.3	134	71.2

APPENDIX F

50 KW Condensing Data

TABLE F-1 NOMENCLATURE FOR CONDENSING HEAT TRANSFER RESULTS FROM THE 50 KW FACILITY.
(Table F-2)

Column	Symbol	Identification	
131	DATE (e.g., 7.214 + 03 = 7/21/64)		
132	TIME (e.g., 1.9450 + 03 = 1945)		
Fluid Thermocouples			
	TC Number		
134	1	Potassium inlet	
136	2	Potassium inlet	
138	3	Potassium outlet	
140	4	Potassium outlet	
142	5	Sodium outlet	
144	6	Sodium outlet	
146	7	Sodium outlet	
148	8	Sodium inlet	
150	9	Sodium inlet	
152	10	Sodium inlet	
Wall Thermocouples			
	TC Number	Radius Within Tube Wall - Inches	Distance from Condenser Inlet - Inches
154	11	0.376	7 7/8
156	12	0.423	7 7/8
158	13	0.488	7 7/8
160	14	0.556	7 7/8
162	15	-----	7 7/8
164	16	0.371	28 5/8
166	17	0.421	28 5/8
168	18	0.487	28 5/8
170	19	0.561	28 5/8
172	20	-----	28 5/8

Column	Symbol	Identification
174	TKI	Inlet potassium temperature, ^oF
176	TKO	Outlet potassium temperature, ^oF
181-219	TKNC	Corrected temperature of thermocouple N, ^oF
221	TKICC	Corrected inlet potassium temperature, ^oF
223	TKOC	Corrected outlet potassium temperature, ^oF
226	TNAO	Outlet Sodium temperature, ^oF
229	TNAI	Inlet Sodium temperature, ^oF
230	DTNA	Sodium temperature increase, ^oF
235	WNA	Sodium Flow rate, lb/hr
237	TNAM	Sodium mean temperature, ^oF
238	CPNA	Sodium specific heat, Btu/lb-^oF
240	QNA	Sodium heat gain, Btu/hr
243	DTQL	Temperature Difference, Test Section Shell - Ambient, ^oF
246	QC	Condenser load, Btu/hr
247	Q/AA	Average heat flux, Btu/hr-ft^2
251	WK	Potassium flow rate, lb/hr
306	TWIT*	Inner wall temperature at top axial station, ^oF
317	Q/AT*	Heat flux at inner wall at top axial station, Btu/hr-ft^2
319	TWOT*	Outer wall temperature at top axial station, ^oF
324	HCONT*	Condensing heat transfer coefficient at top axial station, Btu/hr-ft^2 ^oF
326	NUCT*	Nusselt's condensing ratio at top axial station, dimensionless
354	TWIB*	Inner wall temperature at bottom axial station, ^oF
365	Q/AB*	Heat flux at inner wall at bottom axial station, Btu/hr-ft^2
367	TWOB*	Outer wall temperature at bottom axial station, ^oF
372	HCONB*	Condensing heat transfer coefficient at bottom axial station, Btu/hr-ft^2 ^oF
374	NUCB*	Nusselt's condensing ratio at bottom axial station, dimensionless
450	PSI HD	Inlet vapor velocity head, psi
451	PI*	Inlet potassium vapor pressure, lb/in^2
452	PO*	Outlet potassium vapor pressure, lb/in^2
453	DPC*	Condensing pressure drop

*These values were also calculated, accounting for the thermocouple standardizations obtained in the vapor standardization runs. The values of the parameters utilizing the thermocouple standardization are indicated in the columns in which the notation for the above parameters are followed by a C, e.g., TWITC is the Inner Wall Temperature at top axial station utilizing the standardized correction factor, ^oF.

Column	Symbol	Identification
700	X B	Potassium Quality, Bottom Station, L/D = 46
495	WKL B	Local Potassium liquid flowrate at bottom station, lb/hr
701	X T	Potassium Quality, Top Station, L/D = 13
498	WKL T	Local Potassium liquid flowrate at top station, lb/hr
504	NREF T	Liquid film Reynolds number at top station, L/D = 13
507	NREF B	Liquid film Reynolds number at bottom station, L/D = 46

TABLE F-2. 50 KW CONDENSING DATA
CONDENSING DATA REDUCTION

	131	132	134	136	138	140
	DATE	TIME	TC1	TC2	TC3	TC4
1	7.2140+03	1.9450+03	1.1380+03	1.1386+03	1.1478+03	1.1476+03
2	7.2140+03	1.9450+03	1.1384+03	1.1390+03	1.1485+03	1.1483+03
3	7.2140+03	1.9450+03	1.1388+03	1.1394+03	1.1489+03	1.1487+03
4	7.2140+03	1.9450+03	1.1385+03	1.1389+03	1.1481+03	1.1481+03
5	7.2140+03	2.0000+03	1.1337+03	1.1339+03	1.1433+03	1.1433+03
6	7.2140+03	2.0000+03	1.1337+03	1.1340+03	1.1434+03	1.1433+03
7	7.2140+03	2.0000+03	1.1338+03	1.1340+03	1.1436+03	1.1436+03
8	7.2240+03	2.3400+02	1.1599+03	1.1606+03	1.1658+03	1.1656+03
9	7.2240+03	2.3400+02	1.1597+03	1.1605+03	1.1657+03	1.1655+03
10	7.2240+03	2.3400+02	1.1596+03	1.1604+03	1.1655+03	1.1654+03
11	7.2240+03	2.3400+02	1.1600+03	1.1607+03	1.1658+03	1.1656+03
12	7.2240+03	2.3400+02	1.1599+03	1.1606+03	1.1655+03	1.1654+03
13	7.2240+03	8.4500+02	1.2496+03	1.2502+03	1.2507+03	1.2506+03
14	7.2240+03	8.4500+02	1.2491+03	1.2496+03	1.2500+03	1.2499+03
15	7.2240+03	8.4500+02	1.2494+03	1.2500+03	1.2505+03	1.2504+03
16	7.2240+03	8.4500+02	1.2498+03	1.2503+03	1.2507+03	1.2506+03
17	7.2240+03	8.4500+02	1.2495+03	1.2502+03	1.2506+03	1.2506+03
18	7.2240+03	9.4500+02	1.2708+03	1.2717+03	1.2746+03	1.2745+03
19	7.2240+03	9.4500+02	1.2706+03	1.2714+03	1.2744+03	1.2744+03
20	7.2240+03	9.4500+02	1.2706+03	1.2714+03	1.2744+03	1.2743+03

CONDENSING DATA REDUCTION

	131	132	134	136	138	140
	DATE	TIME	TC1	TC2	TC3	TC4
21	7.2240+03	1.1000+03	1.2403+03	1.2409+03	1.2450+03	1.2447+03
22	7.2240+03	1.1000+03	1.2400+03	1.2407+03	1.2449+03	1.2447+03
23	7.2240+03	1.1000+03	1.2400+03	1.2406+03	1.2448+03	1.2446+03
24	7.2240+03	1.1000+03	1.2400+03	1.2407+03	1.2447+03	1.2445+03
25	7.2240+03	1.2350+03	1.2164+03	1.2169+03	1.2232+03	1.2230+03
26	7.2240+03	1.2350+03	1.2164+03	1.2168+03	1.2232+03	1.2229+03
27	7.2240+03	1.2350+03	1.2163+03	1.2168+03	1.2231+03	1.2229+03
28	7.2240+03	1.2350+03	1.2162+03	1.2168+03	1.2231+03	1.2229+03
29	7.2240+03	1.2350+03	1.2162+03	1.2168+03	1.2232+03	1.2229+03
30	7.2240+03	1.2350+03	1.2162+03	1.2168+03	1.2232+03	1.2229+03
31	7.2240+03	1.6300+03	1.3124+03	1.3134+03	1.3157+03	1.3154+03
32	7.2240+03	1.6300+03	1.3124+03	1.3135+03	1.3158+03	1.3156+03
33	7.2240+03	1.6300+03	1.3121+03	1.3131+03	1.3158+03	1.3156+03
34	7.2240+03	1.6300+03	1.3115+03	1.3127+03	1.3154+03	1.3151+03

CONDENSING DATA REDUCTION

	142	144	146	148	150	152
	TC5	TC6	TC7	TC8	TC9	TC10
1	1.0937+03	1.0933+03	1.0956+03	1.0767+03	1.0759+03	1.0760+03
2	1.0936+03	1.0933+03	1.0954+03	1.0768+03	1.0758+03	1.0760+03
3	1.0938+03	1.0934+03	1.0955+03	1.0767+03	1.0758+03	1.0760+03
4	1.0936+03	1.0934+03	1.0959+03	1.0766+03	1.0759+03	1.0759+03
5	1.0894+03	1.0892+03	1.0916+03	1.0730+03	1.0721+03	1.0723+03
6	1.0893+03	1.0892+03	1.0916+03	1.0729+03	1.0720+03	1.0721+03
7	1.0892+03	1.0892+03	1.0916+03	1.0728+03	1.0719+03	1.0719+03
8	1.1213+03	1.1209+03	1.1228+03	1.1082+03	1.1074+03	1.1076+03
9	1.1213+03	1.1210+03	1.1230+03	1.1083+03	1.1075+03	1.1077+03
10	1.1215+03	1.1212+03	1.1230+03	1.1085+03	1.1075+03	1.1077+03
11	1.1215+03	1.1212+03	1.1231+03	1.1086+03	1.1077+03	1.1078+03
12	1.1218+03	1.1213+03	1.1231+03	1.1086+03	1.1077+03	1.1079+03
13	1.2147+03	1.2143+03	1.2160+03	1.2041+03	1.2031+03	1.2030+03
14	1.2146+03	1.2142+03	1.2159+03	1.2041+03	1.2029+03	1.2030+03
15	1.2146+03	1.2141+03	1.2159+03	1.2040+03	1.2029+03	1.2030+03
16	1.2147+03	1.2141+03	1.2159+03	1.2040+03	1.2029+03	1.2029+03
17	1.2146+03	1.2141+03	1.2159+03	1.2039+03	1.2028+03	1.2028+03
18	1.2168+03	1.2158+03	1.2183+03	1.1948+03	1.1939+03	1.1935+03
19	1.2167+03	1.2157+03	1.2183+03	1.1948+03	1.1939+03	1.1935+03
20	1.2165+03	1.2156+03	1.2182+03	1.1948+03	1.1938+03	1.1935+03

CONDENSING DATA REDUCTION

	142	144	146	148	150	152
	TC5	TC6	TC7	TC8	TC9	TC10
21	1.1842+03	1.1835+03	1.1860+03	1.1614+03	1.1604+03	1.1605+03
22	1.1841+03	1.1835+03	1.1860+03	1.1620+03	1.1610+03	1.1611+03
23	1.1843+03	1.1836+03	1.1862+03	1.1623+03	1.1612+03	1.1613+03
24	1.1844+03	1.1837+03	1.1862+03	1.1624+03	1.1613+03	1.1613+03
25	1.1626+03	1.1621+03	1.1644+03	1.1400+03	1.1390+03	1.1388+03
26	1.1626+03	1.1621+03	1.1644+03	1.1399+03	1.1389+03	1.1387+03
27	1.1626+03	1.1620+03	1.1644+03	1.1398+03	1.1388+03	1.1386+03
28	1.1625+03	1.1620+03	1.1643+03	1.1397+03	1.1387+03	1.1386+03
29	1.1624+03	1.1620+03	1.1643+03	1.1396+03	1.1386+03	1.1386+03
30	1.1624+03	1.1619+03	1.1643+03	1.1396+03	1.1386+03	1.1385+03
31	1.2523+03	1.2519+03	1.2545+03	1.2270+03	1.2259+03	1.2259+03
32	1.2523+03	1.2517+03	1.2543+03	1.2269+03	1.2259+03	1.2258+03
33	1.2519+03	1.2516+03	1.2543+03	1.2268+03	1.2256+03	1.2259+03
34	1.2518+03	1.2515+03	1.2542+03	1.2268+03	1.2257+03	1.2257+03

CONDENSING DATA REDUCTION

	154	156	158	160	162	164
	TC11	TC12	TC13	TC14	TC15	TC16
1	1.1275+03	1.1208+03	1.1196+03	1.1110+03	0.	1.1335+03
2	1.1278+03	1.1209+03	1.1199+03	1.1111+03	0.	1.1340+03
3	1.1280+03	1.1211+03	1.1200+03	1.1112+03	0.	1.1343+03
4	1.1278+03	1.1211+03	1.1200+03	1.1111+03	0.	1.1338+03
5	1.1226+03	1.1160+03	1.1150+03	1.1065+03	0.	1.1292+03
6	1.1226+03	1.1160+03	1.1150+03	1.1064+03	0.	1.1292+03
7	1.1226+03	1.1160+03	1.1150+03	1.1064+03	0.	1.1292+03
8	1.1500+03	1.1447+03	1.1438+03	1.1369+03	0.	1.1542+03
9	1.1500+03	1.1447+03	1.1438+03	1.1370+03	0.	1.1543+03
10	1.1501+03	1.1448+03	1.1437+03	1.1371+03	0.	1.1541+03
11	1.1502+03	1.1449+03	1.1440+03	1.1371+03	0.	1.1542+03
12	1.1503+03	1.1450+03	1.1440+03	1.1372+03	0.	1.1542+03
13	1.2412+03	1.2368+03	1.2357+03	1.2299+03	0.	1.2423+03
14	1.2409+03	1.2365+03	1.2355+03	1.2298+03	0.	1.2417+03
15	1.2410+03	1.2366+03	1.2356+03	1.2297+03	0.	1.2421+03
16	1.2412+03	1.2368+03	1.2357+03	1.2300+03	0.	1.2423+03
17	1.2412+03	1.2368+03	1.2357+03	1.2298+03	0.	1.2422+03
18	1.2574+03	1.2497+03	1.2482+03	1.2371+03	0.	1.2583+03
19	1.2568+03	1.2490+03	1.2476+03	1.2368+03	0.	1.2579+03
20	1.2567+03	1.2490+03	1.2475+03	1.2366+03	0.	1.2579+03

CONDENSING DATA REDUCTION

	154	156	158	160	162	164
	TC11	TC12	TC13	TC14	TC15	TC16
21	1.2251+03	1.2170+03	1.2155+03	1.2043+03	0.	1.2275+03
22	1.2249+03	1.2169+03	1.2155+03	1.2042+03	0.	1.2274+03
23	1.2249+03	1.2170+03	1.2155+03	1.2044+03	0.	1.2276+03
24	1.2249+03	1.2170+03	1.2155+03	1.2045+03	0.	1.2275+03
25	1.2032+03	1.1954+03	1.1940+03	1.1826+03	0.	1.2065+03
26	1.2032+03	1.1954+03	1.1940+03	1.1826+03	0.	1.2066+03
27	1.2032+03	1.1953+03	1.1939+03	1.1824+03	0.	1.2065+03
28	1.2032+03	1.1953+03	1.1938+03	1.1825+03	0.	1.2064+03
29	1.2031+03	1.1952+03	1.1938+03	1.1824+03	0.	1.2065+03
30	1.2031+03	1.1952+03	1.1938+03	1.1824+03	0.	1.2064+03
31	1.2982+03	1.2890+03	1.2871+03	1.2744+03	0.	1.2980+03
32	1.2981+03	1.2890+03	1.2870+03	1.2744+03	0.	1.2979+03
33	1.2980+03	1.2887+03	1.2869+03	1.2743+03	0.	1.2980+03
34	1.2977+03	1.2885+03	1.2866+03	1.2740+03	0.	1.2980+03

CONDENSING DATA REDUCTION

	166	168	170	172	174	176
	TC17	TC18	TC19	TC20	TKI	TKO
1	1.1244+03	1.1175+03	1.1110+03	0.	1.1383+03	1.1477+03
2	1.1247+03	1.1178+03	1.1113+03	0.	1.1387+03	1.1484+03
3	1.1250+03	1.1179+03	1.1115+03	0.	1.1391+03	1.1488+03
4	1.1246+03	1.1177+03	1.1111+03	0.	1.1387+03	1.1481+03
5	1.1199+03	1.1131+03	1.1069+03	0.	1.1338+03	1.1433+03
6	1.1200+03	1.1130+03	1.1069+03	0.	1.1339+03	1.1433+03
7	1.1200+03	1.1131+03	1.1067+03	0.	1.1339+03	1.1436+03
8	1.1470+03	1.1423+03	1.1365+03	0.	1.1603+03	1.1657+03
9	1.1470+03	1.1422+03	1.1365+03	0.	1.1601+03	1.1656+03
10	1.1470+03	1.1424+03	1.1364+03	0.	1.1600+03	1.1654+03
11	1.1471+03	1.1424+03	1.1365+03	0.	1.1603+03	1.1657+03
12	1.1470+03	1.1425+03	1.1366+03	0.	1.1602+03	1.1655+03
13	1.2368+03	1.2332+03	1.2281+03	0.	1.2499+03	1.2507+03
14	1.2364+03	1.2329+03	1.2278+03	0.	1.2494+03	1.2500+03
15	1.2367+03	1.2330+03	1.2279+03	0.	1.2497+03	1.2504+03
16	1.2368+03	1.2332+03	1.2281+03	0.	1.2500+03	1.2507+03
17	1.2366+03	1.2330+03	1.2279+03	0.	1.2499+03	1.2506+03
18	1.2485+03	1.2415+03	1.2336+03	0.	1.2712+03	1.2746+03
19	1.2480+03	1.2411+03	1.2332+03	0.	1.2710+03	1.2744+03
20	1.2480+03	1.2411+03	1.2333+03	0.	1.2710+03	1.2744+03

CONDENSING DATA REDUCTION

	166	168	170	172	174	176
	TC17	TC18	TC19	TC20	TKI	TKO
21	1.2169+03	1.2091+03	1.2013+03	0.	1.2406+03	1.2449+03
22	1.2169+03	1.2092+03	1.2015+03	0.	1.2404+03	1.2448+03
23	1.2169+03	1.2093+03	1.2018+03	0.	1.2403+03	1.2447+03
24	1.2170+03	1.2094+03	1.2018+03	0.	1.2404+03	1.2446+03
25	1.1960+03	1.1880+03	1.1801+03	0.	1.2166+03	1.2231+03
26	1.1959+03	1.1879+03	1.1800+03	0.	1.2166+03	1.2231+03
27	1.1959+03	1.1879+03	1.1799+03	0.	1.2165+03	1.2230+03
28	1.1958+03	1.1877+03	1.1799+03	0.	1.2165+03	1.2230+03
29	1.1958+03	1.1877+03	1.1799+03	0.	1.2165+03	1.2230+03
30	1.1958+03	1.1876+03	1.1798+03	0.	1.2165+03	1.2231+03
31	1.2865+03	1.2789+03	1.2702+03	0.	1.3129+03	1.3156+03
32	1.2865+03	1.2788+03	1.2702+03	0.	1.3129+03	1.3157+03
33	1.2866+03	1.2788+03	1.2700+03	0.	1.3126+03	1.3157+03
34	1.2864+03	1.2787+03	1.2701+03	0.	1.3121+03	1.3153+03

CONDENSING DATA REDUCTION

	181	183	185	187	189	191
	TC1C	TC2C	TC3C	TC4C	TC5C	TC6C
1	1.1380+03	1.1377+03	1.1480+03	1.1478+03	1.0953+03	1.0952+03
2	1.1384+03	1.1382+03	1.1487+03	1.1486+03	1.0952+03	1.0952+03
3	1.1388+03	1.1386+03	1.1492+03	1.1490+03	1.0954+03	1.0953+03
4	1.1385+03	1.1381+03	1.1484+03	1.1484+03	1.0952+03	1.0953+03
5	1.1337+03	1.1331+03	1.1436+03	1.1436+03	1.0911+03	1.0911+03
6	1.1337+03	1.1332+03	1.1436+03	1.1436+03	1.0910+03	1.0911+03
7	1.1338+03	1.1332+03	1.1438+03	1.1438+03	1.0908+03	1.0911+03
8	1.1599+03	1.1598+03	1.1660+03	1.1658+03	1.1230+03	1.1228+03
9	1.1597+03	1.1597+03	1.1659+03	1.1658+03	1.1230+03	1.1229+03
10	1.1596+03	1.1596+03	1.1657+03	1.1656+03	1.1232+03	1.1231+03
11	1.1600+03	1.1599+03	1.1660+03	1.1659+03	1.1231+03	1.1231+03
12	1.1599+03	1.1597+03	1.1657+03	1.1657+03	1.1235+03	1.1232+03
13	1.2496+03	1.2493+03	1.2509+03	1.2508+03	1.2164+03	1.2162+03
14	1.2491+03	1.2488+03	1.2502+03	1.2501+03	1.2163+03	1.2161+03
15	1.2494+03	1.2492+03	1.2506+03	1.2506+03	1.2162+03	1.2160+03
16	1.2498+03	1.2495+03	1.2509+03	1.2509+03	1.2163+03	1.2160+03
17	1.2495+03	1.2493+03	1.2508+03	1.2508+03	1.2163+03	1.2160+03
18	1.2708+03	1.2708+03	1.2747+03	1.2748+03	1.2185+03	1.2177+03
19	1.2706+03	1.2705+03	1.2745+03	1.2746+03	1.2183+03	1.2176+03
20	1.2706+03	1.2706+03	1.2745+03	1.2745+03	1.2182+03	1.2175+03

CONDENSING DATA REDUCTION

	181	183	185	187	189	191
	TC1C	TC2C	TC3C	TC4C	TC5C	TC6C
21	1.2403+03	1.2401+03	1.2451+03	1.2450+03	1.1858+03	1.1854+03
22	1.2400+03	1.2399+03	1.2450+03	1.2449+03	1.1858+03	1.1854+03
23	1.2400+03	1.2398+03	1.2450+03	1.2448+03	1.1860+03	1.1855+03
24	1.2400+03	1.2399+03	1.2448+03	1.2448+03	1.1860+03	1.1856+03
25	1.2164+03	1.2161+03	1.2234+03	1.2232+03	1.1643+03	1.1640+03
26	1.2164+03	1.2160+03	1.2234+03	1.2232+03	1.1642+03	1.1639+03
27	1.2163+03	1.2160+03	1.2233+03	1.2231+03	1.1642+03	1.1639+03
28	1.2162+03	1.2159+03	1.2233+03	1.2231+03	1.1642+03	1.1639+03
29	1.2162+03	1.2160+03	1.2233+03	1.2231+03	1.1640+03	1.1639+03
30	1.2162+03	1.2160+03	1.2233+03	1.2232+03	1.1641+03	1.1638+03
31	1.3124+03	1.3126+03	1.3158+03	1.3157+03	1.2540+03	1.2538+03
32	1.3124+03	1.3127+03	1.3159+03	1.3158+03	1.2539+03	1.2536+03
33	1.3121+03	1.3123+03	1.3159+03	1.3159+03	1.2536+03	1.2535+03
34	1.3115+03	1.3119+03	1.3155+03	1.3154+03	1.2535+03	1.2534+03

CONDENSING DATA REDUCTION

	193	195	197	199	201	203
	TC7C	TC8C	TC9C	TC10C	TC11C	TC12C
1	1.0970+03	1.0767+03	1.0768+03	1.0764+03	1.1278+03	1.1210+03
2	1.0968+03	1.0768+03	1.0767+03	1.0764+03	1.1281+03	1.1212+03
3	1.0969+03	1.0767+03	1.0767+03	1.0764+03	1.1283+03	1.1213+03
4	1.0973+03	1.0766+03	1.0767+03	1.0763+03	1.1281+03	1.1213+03
5	1.0930+03	1.0730+03	1.0730+03	1.0727+03	1.1229+03	1.1162+03
6	1.0930+03	1.0729+03	1.0729+03	1.0725+03	1.1229+03	1.1163+03
7	1.0930+03	1.0728+03	1.0728+03	1.0723+03	1.1229+03	1.1163+03
8	1.1242+03	1.1082+03	1.1082+03	1.1080+03	1.1502+03	1.1450+03
9	1.1244+03	1.1083+03	1.1083+03	1.1081+03	1.1503+03	1.1449+03
10	1.1244+03	1.1085+03	1.1084+03	1.1081+03	1.1504+03	1.1451+03
11	1.1245+03	1.1086+03	1.1085+03	1.1082+03	1.1505+03	1.1452+03
12	1.1245+03	1.1086+03	1.1085+03	1.1083+03	1.1505+03	1.1453+03
13	1.2174+03	1.2041+03	1.2039+03	1.2034+03	1.2413+03	1.2369+03
14	1.2173+03	1.2041+03	1.2038+03	1.2034+03	1.2410+03	1.2366+03
15	1.2173+03	1.2040+03	1.2038+03	1.2034+03	1.2411+03	1.2367+03
16	1.2173+03	1.2040+03	1.2038+03	1.2033+03	1.2414+03	1.2369+03
17	1.2173+03	1.2039+03	1.2037+03	1.2032+03	1.2413+03	1.2369+03
18	1.2197+03	1.1948+03	1.1947+03	1.1939+03	1.2574+03	1.2498+03
19	1.2197+03	1.1948+03	1.1947+03	1.1939+03	1.2569+03	1.2491+03
20	1.2196+03	1.1948+03	1.1947+03	1.1939+03	1.2568+03	1.2491+03

CONDENSING DATA REDUCTION

	193	195	197	199	201	203
	TC7C	TC8C	TC9C	TC10C	TC11C	TC12C
21	1.1874+03	1.1614+03	1.1613+03	1.1609+03	1.2252+03	1.2171+03
22	1.1874+03	1.1620+03	1.1619+03	1.1615+03	1.2250+03	1.2171+03
23	1.1876+03	1.1623+03	1.1621+03	1.1617+03	1.2250+03	1.2171+03
24	1.1876+03	1.1624+03	1.1621+03	1.1617+03	1.2251+03	1.2171+03
25	1.1658+03	1.1400+03	1.1398+03	1.1392+03	1.2034+03	1.1956+03
26	1.1658+03	1.1399+03	1.1397+03	1.1391+03	1.2034+03	1.1956+03
27	1.1658+03	1.1398+03	1.1397+03	1.1391+03	1.2034+03	1.1955+03
28	1.1657+03	1.1397+03	1.1395+03	1.1390+03	1.2034+03	1.1955+03
29	1.1657+03	1.1396+03	1.1395+03	1.1390+03	1.2033+03	1.1954+03
30	1.1657+03	1.1396+03	1.1394+03	1.1389+03	1.2033+03	1.1954+03
31	1.2559+03	1.2270+03	1.2268+03	1.2263+03	1.2983+03	1.2890+03
32	1.2557+03	1.2269+03	1.2267+03	1.2262+03	1.2982+03	1.2890+03
33	1.2557+03	1.2268+03	1.2265+03	1.2263+03	1.2981+03	1.2888+03
34	1.2556+03	1.2268+03	1.2266+03	1.2261+03	1.2978+03	1.2885+03

CONDENSING DATA REDUCTION

	205	207	209	211	213	215
	TC13C	TC14C	TC15C	TC16C	TC17C	TC18C
1	1.1203+03	1.1106+03	0.	1.1335+03	1.1244+03	1.1167+03
2	1.1206+03	1.1107+03	0.	1.1341+03	1.1247+03	1.1170+03
3	1.1207+03	1.1108+03	0.	1.1344+03	1.1250+03	1.1171+03
4	1.1207+03	1.1107+03	0.	1.1339+03	1.1246+03	1.1169+03
5	1.1157+03	1.1061+03	0.	1.1292+03	1.1199+03	1.1123+03
6	1.1158+03	1.1060+03	0.	1.1292+03	1.1200+03	1.1122+03
7	1.1157+03	1.1059+03	0.	1.1293+03	1.1200+03	1.1124+03
8	1.1445+03	1.1365+03	0.	1.1543+03	1.1471+03	1.1415+03
9	1.1445+03	1.1366+03	0.	1.1544+03	1.1471+03	1.1414+03
10	1.1445+03	1.1367+03	0.	1.1542+03	1.1471+03	1.1416+03
11	1.1447+03	1.1367+03	0.	1.1543+03	1.1471+03	1.1416+03
12	1.1447+03	1.1368+03	0.	1.1542+03	1.1471+03	1.1417+03
13	1.2363+03	1.2294+03	0.	1.2422+03	1.2367+03	1.2323+03
14	1.2361+03	1.2293+03	0.	1.2416+03	1.2363+03	1.2320+03
15	1.2362+03	1.2292+03	0.	1.2421+03	1.2366+03	1.2321+03
16	1.2364+03	1.2295+03	0.	1.2422+03	1.2367+03	1.2323+03
17	1.2363+03	1.2293+03	0.	1.2421+03	1.2365+03	1.2321+03
18	1.2488+03	1.2366+03	0.	1.2582+03	1.2484+03	1.2406+03
19	1.2482+03	1.2362+03	0.	1.2579+03	1.2479+03	1.2402+03
20	1.2481+03	1.2360+03	0.	1.2578+03	1.2479+03	1.2402+03

CONDENSING DATA REDUCTION

	205	207	209	211	213	215
	TC13C	TC14C	TC15C	TC16C	TC17C	TC18C
21	1.2162+03	1.2038+03	0.	1.2275+03	1.2168+03	1.2083+03
22	1.2161+03	1.2037+03	0.	1.2274+03	1.2169+03	1.2084+03
23	1.2162+03	1.2039+03	0.	1.2276+03	1.2169+03	1.2085+03
24	1.2162+03	1.2040+03	0.	1.2275+03	1.2170+03	1.2086+03
25	1.1947+03	1.1822+03	0.	1.2065+03	1.1960+03	1.1872+03
26	1.1947+03	1.1821+03	0.	1.2066+03	1.1959+03	1.1870+03
27	1.1946+03	1.1819+03	0.	1.2064+03	1.1959+03	1.1870+03
28	1.1945+03	1.1821+03	0.	1.2064+03	1.1958+03	1.1869+03
29	1.1945+03	1.1820+03	0.	1.2064+03	1.1958+03	1.1869+03
30	1.1945+03	1.1819+03	0.	1.2064+03	1.1958+03	1.1868+03
31	1.2877+03	1.2739+03	0.	1.2979+03	1.2864+03	1.2779+03
32	1.2876+03	1.2739+03	0.	1.2978+03	1.2863+03	1.2778+03
33	1.2875+03	1.2737+03	0.	1.2979+03	1.2865+03	1.2779+03
34	1.2872+03	1.2734+03	0.	1.2979+03	1.2863+03	1.2778+03

CONDENSING DATA REDUCTION

	217	219	221	223	226	229
	TC19C	TC20C	TKICC	TKOC	TNAO	TNAI
1	1.1122+03	0.	1.1346+03	1.1479+03	1.0958+03	1.0766+03
2	1.1126+03	0.	1.1351+03	1.1487+03	1.0957+03	1.0766+03
3	1.1127+03	0.	1.1354+03	1.1491+03	1.0959+03	1.0766+03
4	1.1123+03	0.	1.1350+03	1.1484+03	1.0959+03	1.0766+03
5	1.1081+03	0.	1.1302+03	1.1436+03	1.0917+03	1.0729+03
6	1.1082+03	0.	1.1302+03	1.1436+03	1.0917+03	1.0727+03
7	1.1079+03	0.	1.1302+03	1.1438+03	1.0916+03	1.0726+03
8	1.1377+03	0.	1.1582+03	1.1659+03	1.1233+03	1.1081+03
9	1.1377+03	0.	1.1580+03	1.1658+03	1.1234+03	1.1082+03
10	1.1377+03	0.	1.1579+03	1.1657+03	1.1236+03	1.1083+03
11	1.1378+03	0.	1.1583+03	1.1659+03	1.1236+03	1.1084+03
12	1.1378+03	0.	1.1581+03	1.1657+03	1.1237+03	1.1085+03
13	1.2292+03	0.	1.2490+03	1.2508+03	1.2167+03	1.2038+03
14	1.2290+03	0.	1.2485+03	1.2502+03	1.2166+03	1.2038+03
15	1.2291+03	0.	1.2488+03	1.2506+03	1.2165+03	1.2037+03
16	1.2293+03	0.	1.2492+03	1.2509+03	1.2166+03	1.2037+03
17	1.2290+03	0.	1.2490+03	1.2508+03	1.2165+03	1.2036+03
18	1.2347+03	0.	1.2698+03	1.2747+03	1.2186+03	1.1945+03
19	1.2344+03	0.	1.2695+03	1.2746+03	1.2185+03	1.1945+03
20	1.2345+03	0.	1.2696+03	1.2745+03	1.2184+03	1.1945+03

CONDENSING DATA REDUCTION

	217	219	221	223	226	229
	TC19C	TC20C	TKICC	TKOC	TNAO	TNAI
21	1.2025+03	0.	1.2388+03	1.2451+03	1.1862+03	1.1612+03
22	1.2027+03	0.	1.2386+03	1.2450+03	1.1862+03	1.1618+03
23	1.2029+03	0.	1.2385+03	1.2449+03	1.1863+03	1.1620+03
24	1.2029+03	0.	1.2386+03	1.2448+03	1.1864+03	1.1621+03
25	1.1813+03	0.	1.2144+03	1.2233+03	1.1647+03	1.1397+03
26	1.1812+03	0.	1.2144+03	1.2233+03	1.1646+03	1.1396+03
27	1.1811+03	0.	1.2143+03	1.2232+03	1.1646+03	1.1395+03
28	1.1811+03	0.	1.2142+03	1.2232+03	1.1646+03	1.1394+03
29	1.1811+03	0.	1.2143+03	1.2232+03	1.1645+03	1.1394+03
30	1.1810+03	0.	1.2143+03	1.2233+03	1.1645+03	1.1393+03
31	1.2713+03	0.	1.3116+03	1.3157+03	1.2546+03	1.2267+03
32	1.2713+03	0.	1.3117+03	1.3159+03	1.2544+03	1.2266+03
33	1.2711+03	0.	1.3113+03	1.3159+03	1.2543+03	1.2265+03
34	1.2712+03	0.	1.3108+03	1.3154+03	1.2542+03	1.2265+03

CONDENSING DATA REDUCTION

	230	235	237	238	240	243
	DTNA	WNA	TNAM	CPNA	QNA	DTQL
1	1.9211+01	4.6271+03	1.0862+03	3.0011-01	2.6677+04	1.0032+03
2	1.9127+01	4.6271+03	1.0862+03	3.0011-01	2.6561+04	1.0031+03
3	1.9309+01	4.6271+03	1.0862+03	3.0011-01	2.6814+04	1.0032+03
4	1.9379+01	4.6271+03	1.0862+03	3.0011-01	2.6911+04	1.0032+03
5	1.8833+01	4.5532+03	1.0823+03	3.0014-01	2.5737+04	9.9928+02
6	1.8917+01	4.5532+03	1.0822+03	3.0014-01	2.5852+04	9.9917+02
7	1.8973+01	4.5532+03	1.0821+03	3.0014-01	2.5929+04	9.9908+02
8	1.5183+01	4.5155+03	1.1157+03	3.0000-01	2.0568+04	1.0265+03
9	1.5155+01	4.5155+03	1.1158+03	3.0000-01	2.0529+04	1.0265+03
10	1.5225+01	4.5155+03	1.1159+03	3.0000-01	2.0625+04	1.0267+03
11	1.5126+01	4.5155+03	1.1160+03	3.0000-01	2.0491+04	1.0267+03
12	1.5239+01	4.5155+03	1.1161+03	3.0000-01	2.0644+04	1.0273+03
13	1.2852+01	4.4090+03	1.2102+03	3.0005-01	1.7002+04	1.0923+03
14	1.2809+01	4.4090+03	1.2102+03	3.0005-01	1.6946+04	1.0922+03
15	1.2795+01	4.4090+03	1.2101+03	3.0005-01	1.6927+04	1.0926+03
16	1.2866+01	4.4090+03	1.2101+03	3.0005-01	1.7021+04	1.0926+03
17	1.2952+01	4.4090+03	1.2101+03	3.0005-01	1.7134+04	1.0921+03
18	2.4148+01	4.3635+03	1.2066+03	3.0003-01	3.1614+04	1.0894+03
19	2.4048+01	4.3635+03	1.2065+03	3.0003-01	3.1484+04	1.0877+03
20	2.3963+01	4.3635+03	1.2064+03	3.0003-01	3.1372+04	1.0889+03

CONDENSING DATA REDUCTION

	230	235	237	238	240	243
	DTNA	WNA	TNAM	CPNA	QNA	DTQL
21	2.4989+01	4.3227+03	1.1737+03	3.0000-01	3.2405+04	1.0531+03
22	2.4376+01	4.3227+03	1.1740+03	3.0000-01	3.1611+04	1.0556+03
23	2.4333+01	4.3227+03	1.1742+03	3.0000-01	3.1555+04	1.0553+03
24	2.4319+01	4.3227+03	1.1742+03	3.0000-01	3.1537+04	1.0554+03
25	2.5011+01	4.2801+03	1.1522+03	3.0000-01	3.2115+04	1.0325+03
26	2.5053+01	4.2801+03	1.1521+03	3.0000-01	3.2168+04	1.0354+03
27	2.5109+01	4.2801+03	1.1521+03	3.0000-01	3.2241+04	1.0402+03
28	2.5151+01	4.2801+03	1.1520+03	3.0000-01	3.2295+04	1.0353+03
29	2.5179+01	4.2801+03	1.1520+03	3.0000-01	3.2331+04	1.0348+03
30	2.5207+01	4.2801+03	1.1519+03	3.0000-01	3.2367+04	1.0339+03
31	2.7852+01	4.3406+03	1.2406+03	3.0020-01	3.6293+04	1.1630+03
32	2.7795+01	4.3406+03	1.2405+03	3.0020-01	3.6218+04	1.1628+03
33	2.7738+01	4.3406+03	1.2404+03	3.0020-01	3.6144+04	1.1627+03
34	2.7695+01	4.3406+03	1.2403+03	3.0020-01	3.6088+04	1.1626+03

CONDENSING DATA REDUCTION

	246	247	251	306	317	319
	QC	Q/AA	WK	TWI T	Q/A T	TWO T
1	2.9009+04	5.8284+04	3.3137+01	1.1342+03	5.4956+04	1.0966+03
2	2.8892+04	5.8049+04	3.3006+01	1.1346+03	5.5494+04	1.0966+03
3	2.9145+04	5.8558+04	3.3298+01	1.1347+03	5.5631+04	1.0967+03
4	2.9242+04	5.8753+04	3.3406+01	1.1346+03	5.5609+04	1.0966+03
5	2.8054+04	5.6365+04	3.2025+01	1.1290+03	5.3141+04	1.0926+03
6	2.8168+04	5.6595+04	3.2156+01	1.1292+03	5.3559+04	1.0925+03
7	2.8244+04	5.6749+04	3.2243+01	1.1292+03	5.3932+04	1.0923+03
8	2.2986+04	4.6184+04	2.6346+01	1.1553+03	4.3791+04	1.1255+03
9	2.2949+04	4.6108+04	2.6302+01	1.1553+03	4.3502+04	1.1257+03
10	2.3045+04	4.6301+04	2.6411+01	1.1554+03	4.3700+04	1.1256+03
11	2.2911+04	4.6033+04	2.6260+01	1.1555+03	4.3653+04	1.1258+03
12	2.3066+04	4.6345+04	2.6437+01	1.1556+03	4.3664+04	1.1258+03
13	1.9676+04	3.9533+04	2.2880+01	1.2458+03	3.8847+04	1.2200+03
14	1.9619+04	3.9419+04	2.2812+01	1.2454+03	3.7939+04	1.2201+03
15	1.9602+04	3.9384+04	2.2793+01	1.2457+03	3.8940+04	1.2197+03
16	1.9696+04	3.9574+04	2.2904+01	1.2459+03	3.8757+04	1.2201+03
17	1.9807+04	3.9797+04	2.3033+01	1.2459+03	3.9050+04	1.2199+03
18	3.4277+04	6.8870+04	4.0020+01	1.2659+03	6.9400+04	1.2197+03
19	3.4140+04	6.8594+04	3.9858+01	1.2651+03	6.8639+04	1.2195+03
20	3.4033+04	6.8378+04	3.9733+01	1.2650+03	6.8896+04	1.2193+03

CONDENSING DATA REDUCTION

	246	247	251	306	317	319
	QC	Q/AA	WK	TWI T	Q/A T	TWO T
21	3.4926+04	7.0174+04	4.0555+01	1.2337+03	7.0656+04	1.1864+03
22	3.4141+04	6.8597+04	3.9643+01	1.2335+03	7.0188+04	1.1865+03
23	3.4085+04	6.8484+04	3.9577+01	1.2334+03	6.9619+04	1.1868+03
24	3.4067+04	6.8447+04	3.9556+01	1.2333+03	6.9327+04	1.1869+03
25	3.4556+04	6.9431+04	3.9974+01	1.2119+03	6.9667+04	1.1650+03
26	3.4622+04	6.9562+04	4.0049+01	1.2119+03	6.9761+04	1.1649+03
27	3.4712+04	6.9744+04	4.0153+01	1.2119+03	7.0183+04	1.1646+03
28	3.4748+04	6.9815+04	4.0194+01	1.2118+03	6.9852+04	1.1648+03
29	3.4781+04	6.9883+04	4.0233+01	1.2118+03	6.9989+04	1.1647+03
30	3.4814+04	6.9949+04	4.0271+01	1.2118+03	7.0136+04	1.1646+03
31	3.9251+04	7.8864+04	4.6174+01	1.3081+03	8.2398+04	1.2538+03
32	3.9176+04	7.8713+04	4.6086+01	1.3080+03	8.2165+04	1.2538+03
33	3.9102+04	7.8563+04	4.5997+01	1.3078+03	8.2139+04	1.2537+03
34	3.9046+04	7.8450+04	4.5927+01	1.3075+03	8.2189+04	1.2534+03

CONDENSING DATA REDUCTION

	324 HCON T	326 NUC T	354 TWI B	365 Q/A B	367 TWO B	372 HCON B
1	9.0192+03	2.5184-02	1.1417+03	7.6814+04	1.0891+03	1.9195+04
2	8.8566+03	2.4731-02	1.1422+03	7.7506+04	1.0892+03	1.8894+04
3	8.5812+03	2.3963-02	1.1426+03	7.8127+04	1.0891+03	1.8855+04
4	9.1468+03	2.5542-02	1.1421+03	7.7603+04	1.0890+03	1.9303+04
5	7.7583+03	2.1654-02	1.1371+03	7.6054+04	1.0851+03	1.8414+04
6	7.9346+03	2.2146-02	1.1371+03	7.5971+04	1.0851+03	1.8297+04
7	7.9771+03	2.2265-02	1.1374+03	7.6806+04	1.0848+03	1.8591+04
8	7.1696+03	2.0062-02	1.1607+03	6.0230+04	1.1197+03	1.5740+04
9	7.2125+03	2.0182-02	1.1608+03	6.0578+04	1.1195+03	1.6581+04
10	7.5348+03	2.1083-02	1.1606+03	6.0017+04	1.1198+03	1.6354+04
11	7.2522+03	2.0293-02	1.1607+03	6.0107+04	1.1198+03	1.5581+04
12	7.5536+03	2.1136-02	1.1606+03	5.9658+04	1.1200+03	1.5856+04
13	9.2642+03	2.6255-02	1.2476+03	4.9018+04	1.2149+03	1.6720+04
14	9.2527+03	2.6220-02	1.2469+03	4.7750+04	1.2150+03	1.5963+04
15	9.3242+03	2.6424-02	1.2474+03	4.9017+04	1.2148+03	1.7139+04
16	9.0323+03	2.5598-02	1.2475+03	4.8880+04	1.2150+03	1.6240+04
17	9.4510+03	2.6784-02	1.2475+03	4.9188+04	1.2147+03	1.6490+04
18	1.1376+04	3.2365-02	1.2674+03	8.6182+04	1.2101+03	1.3314+04
19	1.0367+04	2.9492-02	1.2669+03	8.6108+04	1.2097+03	1.2860+04
20	1.0314+04	2.9342-02	1.2668+03	8.5520+04	1.2099+03	1.2527+04

CONDENSING DATA REDUCTION

	324	326	354	365	367	372
	HCON T	NUC T	TWI B	Q/A B	TWO B	HCON B
21	8.9982+03	2.5463-02	1.2371+03	9.1213+04	1.1760+03	1.3217+04
22	8.9357+03	2.5285-02	1.2369+03	9.0223+04	1.1764+03	1.2978+04
23	8.8422+03	2.5020-02	1.2369+03	8.9840+04	1.1767+03	1.3099+04
24	8.7153+03	2.4661-02	1.2368+03	8.9542+04	1.1769+03	1.3064+04
25	1.1325+04	3.1914-02	1.2162+03	9.1601+04	1.1546+03	1.6654+04
26	1.1354+04	3.1996-02	1.2164+03	9.2444+04	1.1541+03	1.7378+04
27	1.1578+04	3.2628-02	1.2162+03	9.2053+04	1.1542+03	1.7071+04
28	1.1476+04	3.2340-02	1.2161+03	9.1822+04	1.1543+03	1.6657+04
29	1.1355+04	3.1998-02	1.2161+03	9.2080+04	1.1542+03	1.6827+04
30	1.1404+04	3.2137-02	1.2162+03	9.2447+04	1.1539+03	1.6899+04
31	1.5237+04	4.3663-02	1.3080+03	9.7580+04	1.2437+03	1.3935+04
32	1.4790+04	4.2383-02	1.3079+03	9.7355+04	1.2437+03	1.3472+04
33	1.5079+04	4.3210-02	1.3082+03	9.8425+04	1.2433+03	1.4330+04
34	1.5686+04	4.4945-02	1.3079+03	9.7752+04	1.2435+03	1.4714+04

CONDENSING DATA REDUCTION

	374	389	399	401	406	408
	NUC B	TWI TC	Q/A TC	TWO TC	HCONTC	NUC TC
1	5.3628-02	1.1349+03	5.6708+04	1.0961+03	2.1832+04	6.0944-02
2	5.2789-02	1.1352+03	5.7247+04	1.0960+03	2.0438+04	5.7055-02
3	5.2683-02	1.1354+03	5.7383+04	1.0961+03	1.9184+04	5.3556-02
4	5.3931-02	1.1353+03	5.7361+04	1.0961+03	2.2406+04	6.2549-02
5	5.1422-02	1.1297+03	5.4891+04	1.0921+03	1.6297+04	4.5473-02
6	5.1096-02	1.1298+03	5.5309+04	1.0919+03	1.7012+04	4.7467-02
7	5.1917-02	1.1299+03	5.5681+04	1.0917+03	1.7130+04	4.7798-02
8	4.4058-02	1.1560+03	4.5552+04	1.1250+03	1.1773+04	3.2938-02
9	4.6410-02	1.1559+03	4.5263+04	1.1251+03	1.1930+04	3.3377-02
10	4.5776-02	1.1560+03	4.5461+04	1.1251+03	1.2802+04	3.5815-02
11	4.3612-02	1.1562+03	4.5414+04	1.1252+03	1.1985+04	3.3532-02
12	4.4381-02	1.1562+03	4.5425+04	1.1253+03	1.2856+04	3.5969-02
13	4.7388-02	1.2463+03	4.0374+04	1.2194+03	1.3198+04	3.7399-02
14	4.5239-02	1.2459+03	3.9469+04	1.2196+03	1.3311+04	3.7715-02
15	4.8573-02	1.2462+03	4.0468+04	1.2192+03	1.3295+04	3.7674-02
16	4.6028-02	1.2464+03	4.0285+04	1.2195+03	1.2761+04	3.6161-02
17	4.6738-02	1.2464+03	4.0577+04	1.2193+03	1.3555+04	3.8412-02
18	3.7891-02	1.2663+03	7.0845+04	1.2192+03	1.5438+04	4.3912-02
19	3.6598-02	1.2655+03	7.0087+04	1.2189+03	1.3713+04	3.9003-02
20	3.5649-02	1.2655+03	7.0343+04	1.2187+03	1.3594+04	3.8665-02

CONDENSING DATA REDUCTION

	374	389	399	401	406	408
	NUC B	TWI TC	Q/A TC	TWO TC	HCONTC	NUC TC
21	3.7416-02	1.2342+03	7.2173+04	1.1859+03	1.2149+04	3.4369-02
22	3.6739-02	1.2340+03	7.1707+04	1.1860+03	1.1984+04	3.3901-02
23	3.7082-02	1.2339+03	7.1139+04	1.1863+03	1.1847+04	3.3514-02
24	3.6981-02	1.2339+03	7.0847+04	1.1864+03	1.1637+04	3.2922-02
25	4.6962-02	1.2124+03	7.1236+04	1.1645+03	1.8285+04	5.1512-02
26	4.9002-02	1.2124+03	7.1329+04	1.1644+03	1.8369+04	5.1750-02
27	4.8136-02	1.2124+03	7.1751+04	1.1642+03	1.8916+04	5.3287-02
28	4.6970-02	1.2124+03	7.1421+04	1.1643+03	1.8723+04	5.2745-02
29	4.7450-02	1.2123+03	7.1558+04	1.1642+03	1.8397+04	5.1825-02
30	4.7653-02	1.2123+03	7.1705+04	1.1641+03	1.8513+04	5.2153-02
31	3.9943-02	1.3085+03	8.3924+04	1.2532+03	2.0792+04	5.9573-02
32	3.8616-02	1.3084+03	8.3691+04	1.2532+03	1.9991+04	5.7277-02
33	4.1076-02	1.3082+03	8.3666+04	1.2531+03	2.0515+04	5.8776-02
34	4.2172-02	1.3080+03	8.3715+04	1.2528+03	2.1635+04	6.1980-02

CONDENSING DATA REDUCTION

	424	434	436	440	442	450
	TWI BC	Q/A BC	TWO BC	HCONBC	NUC BC	PSI HD
1	1.1410+03	7.3874+04	1.0905+03	1.8297+04	5.1114-02	2.8911-01
2	1.1416+03	7.4565+04	1.0906+03	1.7982+04	5.0239-02	2.8592-01
3	1.1420+03	7.5186+04	1.0905+03	1.7986+04	5.0250-02	2.9033-01
4	1.1414+03	7.4663+04	1.0904+03	1.8438+04	5.1510-02	2.9310-01
5	1.1365+03	7.3117+04	1.0864+03	1.7534+04	4.8961-02	2.7815-01
6	1.1365+03	7.3033+04	1.0865+03	1.7443+04	4.8706-02	2.8043-01
7	1.1367+03	7.3869+04	1.0861+03	1.7743+04	4.9546-02	2.8194-01
8	1.1600+03	5.7274+04	1.1211+03	1.3618+04	3.8116-02	1.5691-01
9	1.1601+03	5.7622+04	1.1209+03	1.4287+04	3.9989-02	1.5653-01
10	1.1600+03	5.7061+04	1.1211+03	1.4101+04	3.9468-02	1.5796-01
11	1.1601+03	5.7151+04	1.1212+03	1.3481+04	3.7733-02	1.5579-01
12	1.1599+03	5.6702+04	1.1214+03	1.3697+04	3.8338-02	1.5805-01
13	1.2468+03	4.5983+04	1.2162+03	1.2668+04	3.5903-02	6.8431-02
14	1.2461+03	4.4717+04	1.2163+03	1.2122+04	3.4353-02	6.8218-02
15	1.2467+03	4.5981+04	1.2160+03	1.2921+04	3.6621-02	6.7968-02
16	1.2468+03	4.5845+04	1.2162+03	1.2364+04	3.5043-02	6.8508-02
17	1.2467+03	4.6152+04	1.2159+03	1.2542+04	3.5546-02	6.9356-02
18	1.2666+03	8.3096+04	1.2113+03	1.1750+04	3.3439-02	1.8610-01
19	1.2662+03	8.3021+04	1.2110+03	1.1380+04	3.2385-02	1.8487-01
20	1.2660+03	8.2434+04	1.2112+03	1.1098+04	3.1583-02	1.8366-01

CONDENSING DATA REDUCTION

	424	434	436	440	442	450
	TWI BC	Q/A BC	TWO BC	HCONBC	NUC BC	PSI HD
21	1.2363+03	8.8120+04	1.1773+03	1.1931+04	3.3775-02	2.2794-01
22	1.2361+03	8.7131+04	1.1778+03	1.1700+04	3.3120-02	2.1805-01
23	1.2362+03	8.6748+04	1.1781+03	1.1795+04	3.3390-02	2.1740-01
24	1.2361+03	8.6451+04	1.1782+03	1.1761+04	3.3292-02	2.1706-01
25	1.2155+03	8.8507+04	1.1559+03	1.5031+04	4.2384-02	2.5541-01
26	1.2157+03	8.9349+04	1.1555+03	1.5658+04	4.4149-02	2.5641-01
27	1.2155+03	8.8959+04	1.1556+03	1.5399+04	4.3420-02	2.5787-01
28	1.2154+03	8.8728+04	1.1556+03	1.5049+04	4.2434-02	2.5849-01
29	1.2154+03	8.8986+04	1.1555+03	1.5198+04	4.2854-02	2.5894-01
30	1.2155+03	8.9352+04	1.1553+03	1.5267+04	4.3047-02	2.5946-01
31	1.3072+03	9.4604+04	1.2448+03	1.2390+04	3.5513-02	1.9725-01
32	1.3071+03	9.4379+04	1.2449+03	1.2007+04	3.4416-02	1.9645-01
33	1.3074+03	9.5448+04	1.2445+03	1.2723+04	3.6468-02	1.9605-01
34	1.3072+03	9.4776+04	1.2447+03	1.3024+04	3.7328-02	1.9598-01

CONDENSING DATA REDUCTION

	451	452	453	610	611	613
	PI	PO	DPC	PIC	POC	DPCC
1	2.9999+00	3.2042+00	-2.0429-01	2.9239+00	3.2095+00	-2.8561-01
2	3.0091+00	3.2200+00	-2.1088-01	2.9339+00	3.2253+00	-2.9137-01
3	3.0170+00	3.2293+00	-2.1228-01	2.9411+00	3.2346+00	-2.9349-01
4	3.0082+00	3.2139+00	-2.0571-01	2.9316+00	3.2192+00	-2.8766-01
5	2.9077+00	3.1084+00	-2.0070-01	2.8321+00	3.1137+00	-2.8164-01
6	2.9081+00	3.1089+00	-2.0073-01	2.8321+00	3.1142+00	-2.8213-01
7	2.9086+00	3.1140+00	-2.0540-01	2.8322+00	3.1193+00	-2.8710-01
8	3.4933+00	3.6261+00	-1.3276-01	3.4450+00	3.6320+00	-1.8692-01
9	3.4897+00	3.6245+00	-1.3486-01	3.4416+00	3.6304+00	-1.8879-01
10	3.4870+00	3.6209+00	-1.3381-01	3.4388+00	3.6267+00	-1.8793-01
11	3.4954+00	3.6272+00	-1.3171-01	3.4473+00	3.6330+00	-1.8573-01
12	3.4923+00	3.6214+00	-1.2909-01	3.4438+00	3.6273+00	-1.8345-01
13	6.2444+00	6.2752+00	-3.0832-02	6.2112+00	6.2824+00	-7.1216-02
14	6.2252+00	6.2484+00	-2.3180-02	6.1920+00	6.2556+00	-6.3545-02
15	6.2388+00	6.2668+00	-2.8028-02	6.2057+00	6.2741+00	-6.8328-02
16	6.2509+00	6.2761+00	-2.5196-02	6.2176+00	6.2833+00	-6.5661-02
17	6.2436+00	6.2727+00	-2.9112-02	6.2102+00	6.2799+00	-6.9708-02
18	7.1087+00	7.2531+00	-1.4438-01	7.0476+00	7.2605+00	-2.1291-01
19	7.0967+00	7.2447+00	-1.4808-01	7.0363+00	7.2521+00	-2.1588-01
20	7.0985+00	7.2438+00	-1.4530-01	7.0383+00	7.2512+00	-2.1294-01

CONDENSING DATA REDUCTION

	451	452	453	610	611	613
	PI	PO	DPC	PIC	POC	DPCC
21	5.8983+00	6.0574+00	-1.5906-01	5.8318+00	6.0644+00	-2.3261-01
22	5.8887+00	6.0534+00	-1.6466-01	5.8245+00	6.0604+00	-2.3589-01
23	5.8863+00	6.0510+00	-1.6465-01	5.8223+00	6.0580+00	-2.3566-01
24	5.8895+00	6.0478+00	-1.5826-01	5.8254+00	6.0548+00	-2.2934-01
25	5.0728+00	5.2867+00	-2.1391-01	5.0016+00	5.2935+00	-2.9194-01
26	5.0721+00	5.2853+00	-2.1316-01	5.0007+00	5.2921+00	-2.9138-01
27	5.0700+00	5.2824+00	-2.1232-01	4.9983+00	5.2892+00	-2.9086-01
28	5.0680+00	5.2824+00	-2.1438-01	4.9961+00	5.2892+00	-2.9306-01
29	5.0694+00	5.2831+00	-2.1373-01	4.9974+00	5.2899+00	-2.9249-01
30	5.0687+00	5.2845+00	-2.1586-01	4.9966+00	5.2913+00	-2.9473-01
31	9.0678+00	9.2084+00	-1.4057-01	9.0020+00	9.2173+00	-2.1536-01
32	9.0701+00	9.2140+00	-1.4391-01	9.0044+00	9.2229+00	-2.1854-01
33	9.0522+00	9.2151+00	-1.6288-01	8.9865+00	9.2240+00	-2.3750-01
34	9.0266+00	9.1917+00	-1.6511-01	8.9608+00	9.2006+00	-2.3981-01

CONDENSING DATA REDUCTION

	700	495	701	498	504	507
	X B	WKL B	X T	WKL T	NREF T	NREF B
1	3.0754-01	2.2946+01	8.6606-01	4.4383+00	2.9276+02	1.5213+03
2	3.0763-01	2.2853+01	8.6622-01	4.4157+00	2.9138+02	1.5159+03
3	3.0771-01	2.3052+01	8.6626-01	4.4532+00	2.9393+02	1.5295+03
4	3.0744-01	2.3135+01	8.6597-01	4.4773+00	2.9541+02	1.5344+03
5	3.0840-01	2.2148+01	8.6684-01	4.2644+00	2.8046+02	1.4641+03
6	3.0841-01	2.2239+01	8.6683-01	4.2821+00	2.8162+02	1.4701+03
7	3.0946-01	2.2265+01	8.6772-01	4.2652+00	2.8052+02	1.4721+03
8	2.8297-01	1.8891+01	8.4535-01	4.0743+00	2.7287+02	1.2682+03
9	2.8374-01	1.8839+01	8.4601-01	4.0502+00	2.7123+02	1.2647+03
10	2.8410-01	1.8908+01	8.4629-01	4.0597+00	2.7185+02	1.2693+03
11	2.8286-01	1.8832+01	8.4525-01	4.0636+00	2.7217+02	1.2643+03
12	2.8302-01	1.8955+01	8.4535-01	4.0884+00	2.7380+02	1.2724+03
13	2.5330-01	1.7085+01	8.1922-01	4.1362+00	2.9216+02	1.2075+03
14	2.5283-01	1.7044+01	8.1880-01	4.1336+00	2.9188+02	1.2042+03
15	2.5288-01	1.7029+01	8.1885-01	4.1289+00	2.9161+02	1.2034+03
16	2.5235-01	1.7124+01	8.1838-01	4.1599+00	2.9385+02	1.2103+03
17	2.5320-01	1.7201+01	8.1913-01	4.1658+00	2.9424+02	1.2156+03
18	2.6337-01	2.9480+01	8.2799-01	6.8841+00	4.9236+02	2.1119+03
19	2.6366-01	2.9349+01	8.2824-01	6.8459+00	4.8956+02	2.1023+03
20	2.6322-01	2.9275+01	8.2787-01	6.8394+00	4.8910+02	2.0969+03

CONDENSING DATA REDUCTION

	700	495	701	498	504	507
	X B	WKL B	X T	WKL T	NREF T	NREF B
21	2.6716-01	2.9720+01	8.3132-01	6.8409+00	4.8063+02	2.0924+03
22	2.6703-01	2.9057+01	8.3124-01	6.6901+00	4.6998+02	2.0455+03
23	2.6716-01	2.9004+01	8.3135-01	6.6747+00	4.6888+02	2.0417+03
24	2.6659-01	2.9011+01	8.3085-01	6.6908+00	4.7003+02	2.0421+03
25	2.7815-01	2.8855+01	8.4080-01	6.3637+00	4.4095+02	2.0057+03
26	2.7810-01	2.8911+01	8.4076-01	6.3773+00	4.4188+02	2.0095+03
27	2.7817-01	2.8984+01	8.4081-01	6.3919+00	4.4287+02	2.0145+03
28	2.7846-01	2.9001+01	8.4106-01	6.3885+00	4.4262+02	2.0157+03
29	2.7834-01	2.9035+01	8.4095-01	6.3990+00	4.4336+02	2.0181+03
30	2.7860-01	2.9052+01	8.4117-01	6.3962+00	4.4316+02	2.0193+03
31	2.6066-01	3.4138+01	8.2554-01	8.0556+00	5.8965+02	2.5023+03
32	2.6062-01	3.4075+01	8.2551-01	8.0415+00	5.8864+02	2.4979+03
33	2.6164-01	3.3962+01	8.2641-01	7.9846+00	5.8438+02	2.4895+03
34	2.6199-01	3.3895+01	8.2671-01	7.9587+00	5.8231+02	2.4839+03

TABLE F-3. NOMENCLATURE FOR CONDENSING HEAT TRANSFER RESULTS FROM THE 50 KW FACILITY.
(Table F-4)

Column	Symbol	Identification
131	DATE (e.g., 5,1730 + 03 = 5/17/63)	
132	TIME (e.g., 8.1000 + 02 = 0810)	

<u>Fluid Thermocouples</u>

Column	TC Number	Identification
134	1	Potassium inlet
136	2	Potassium inlet
138	3	Potassium outlet
140	4	Potassium outlet
801	48	Potassium outlet
142	5	Sodium outlet
144	6	Sodium outlet
146	7	Sodium outlet
148	8	Sodium inlet
150	9	Sodium inlet
152	10	Sodium inlet

<u>Wall Thermocouples</u>

Column	TC Number	Radius Within Tube Wall - Inches	Distance from Condenser Inlet - Inches*
154	11	0.398	18 -
156	12	0.449	18 -
158	13	0.518	18 -
160	14	0.601	18 -
162	15	0.698	18 -
164	16	0.398	18 +
166	17	0.449	18 +
168	18	0.518	18 +
170	19	0.601	18 +
172	20	0.698	18 +

*Wall thermocouples were butted together during this set of tests with 11-15 entering from the top and 16-20 from the bottom.

Column	Symbol	Identification
174	TKI	Inlet potassium temperature, ^oF
176	TKO	Outlet potassium temperature, ^oF
181-219, 804	TKNC	Corrected temperature of thermocouple N, ^oF
221	TKICC	Corrected inlet potassium temperature, ^oF
223	TKOC	Corrected outlet potassium temperature, ^oF
226	TNAO	Outlet Sodium temperature, ^oF
229	TNAI	Inlet Sodium temperature, ^oF
230	DTNA	Sodium temperature increase, ^oF
235	WNA	Sodium Flow rate, lb/hr
237	TNAM	Sodium mean temperature, ^oF
238	CPNA	Sodium specific heat, Btu/lb-^oF
240	QNA	Sodium heat gain, Btu/hr
243	DTQL	Temperature Difference, Test Section Shell - Ambient, ^oF
246	QC	Condenser load, Btu/hr
247	Q/AA	Average heat flux, Btu/hr-ft^2
251	WK	Potassium flow rate, lb/hr
306	TWIT*	Inner wall temperature at top axial station, ^oF
317	Q/AT*	Heat flux at inner wall at top axial station, Btu/hr-ft^2
319	TWOT*	Outer wall temperature at top axial station, ^oF
324	HCONT*	Condensing heat transfer coefficient at top axial station, Btu/hr-ft^2 ^oF
326	NUCT*	Nusselt's condensing ratio at top axial station, dimensionless
354	TWIB*	Inner wall temperature at bottom axial station, ^oF
365	Q/AB*	Heat flux at inner wall at bottom axial station, Btu/hr-ft^2
367	TWOB*	Outer wall temperature at bottom axial station, ^oF
372	HCONB*	Condensing heat transfer coefficient at bottom axial station, Btu/hr-ft^2 ^oF
374	NUCB*	Nusselt's condensing ratio at bottom axial station, dimensionless
450	PSI HD	Inlet vapor velocity head, psi
451	PI*	Inlet potassium vapor pressure, lb/in^2
452	PO*	Outlet potassium vapor pressure, lb/in^2
453	DPC*	Condensing pressure drop

*These values were also calculated, accounting for the thermocouple standardizations obtained in the vapor standardization runs. The values of the parameters utilizing the thermocouple standardization are indicated in the columns in which the notation for the above parameters are followed by a C, e.g., TWITC is the Inner Wall Temperature at top axial station utilizing the standardized correction factor, ^oF.

Column	Symbol	Identification
700	X B	Potassium Quality, Bottom Station, L/D = 29
495	WKL B	Local Potassium liquid flowrate at bottom station, lb/hr
701	X T	Potassium Quality, Top Station, L/D = 29
498	WKL T	Local Potassium liquid flowrate at top station, lb/hr
504	NREF T	Liquid film Reynolds number at top station, L/D = 29
507	NREF B	Liquid film Reynolds number at bottom station, L/D = 29

TABLE F-4. 50 KW CONDENSING DATA

CONDENSING DATA REDUCTION

	131	132	134	136	138	140
	DATE	TIME	TC1	TC2	TC3	TC4
1	5.1730+03	8.1000+02	1.1514+03	1.1500+03	1.1419+03	1.1472+03
2	5.1730+03	8.1000+02	1.1512+03	1.1500+03	1.1422+03	1.1470+03
3	5.1730+03	8.1000+02	1.1514+03	1.1503+03	1.1423+03	1.1473+03
4	5.1730+03	8.4500+02	1.1673+03	1.1661+03	1.1576+03	1.1626+03
5	5.1730+03	8.4500+02	1.1673+03	1.1662+03	1.1576+03	1.1626+03
6	5.1730+03	8.4500+02	1.1672+03	1.1661+03	1.1576+03	1.1626+03
7	5.1730+03	9.0700+02	1.1721+03	1.1710+03	1.1624+03	1.1674+03
8	5.1730+03	9.0700+02	1.1723+03	1.1715+03	1.1624+03	1.1674+03
9	5.1730+03	9.0700+02	1.1723+03	1.1714+03	1.1626+03	1.1676+03
10	5.1730+03	9.3500+02	1.1775+03	1.1767+03	1.1673+03	1.1723+03
11	5.1730+03	9.3500+02	1.1773+03	1.1762+03	1.1673+03	1.1721+03
12	5.1730+03	9.3500+02	1.1774+03	1.1766+03	1.1673+03	1.1723+03
13	5.1730+03	1.0300+03	1.1727+03	1.1715+03	1.1635+03	1.1684+03
14	5.1730+03	1.0300+03	1.1728+03	1.1718+03	1.1634+03	1.1683+03
15	5.1730+03	1.0300+03	1.1729+03	1.1718+03	1.1634+03	1.1682+03
16	5.1730+03	1.0450+03	1.1706+03	1.1694+03	1.1614+03	1.1662+03
17	5.1730+03	1.0450+03	1.1706+03	1.1697+03	1.1613+03	1.1662+03
18	5.1730+03	1.0450+03	1.1707+03	1.1695+03	1.1613+03	1.1662+03
19	5.1730+03	1.1150+03	1.1671+03	1.1661+03	1.1582+03	1.1629+03
20	5.1730+03	1.1150+03	1.1672+03	1.1662+03	1.1582+03	1.1630+03

CONDENSING DATA REDUCTION

	131	132	134	136	138	140
	DATE	TIME	TC1	TC2	TC3	TC4
21	5.1730+03	1.1150+03	1.1668+03	1.1662+03	1.1583+03	1.1629+03
22	5.1730+03	1.1400+03	1.1675+03	1.1665+03	1.1583+03	1.1630+03
23	5.1730+03	1.1400+03	1.1674+03	1.1662+03	1.1583+03	1.1631+03
24	5.1730+03	1.1400+03	1.1672+03	1.1661+03	1.1583+03	1.1630+03
25	5.1730+03	1.2100+03	1.1718+03	1.1708+03	1.1626+03	1.1673+03
26	5.1730+03	1.2100+03	1.1718+03	1.1706+03	1.1626+03	1.1673+03
27	5.1730+03	1.2100+03	1.1718+03	1.1708+03	1.1626+03	1.1674+03
28	5.1730+03	1.3110+03	1.1753+03	1.1748+03	1.1664+03	1.1710+03
29	5.1730+03	1.3110+03	1.1755+03	1.1751+03	1.1664+03	1.1710+03
30	5.1730+03	1.3110+03	1.1755+03	1.1753+03	1.1662+03	1.1710+03
31	5.1730+03	1.4110+03	1.1782+03	1.1782+03	1.1693+03	1.1740+03
32	5.1730+03	1.4110+03	1.1785+03	1.1783+03	1.1693+03	1.1740+03
33	5.1730+03	1.4110+03	1.1784+03	1.1783+03	1.1693+03	1.1740+03

CONDENSING DATA REDUCTION

	142	144	146	148	150	152
	TC5	TC6	TC7	TC8	TC9	TC10
1	1.1344+03	1.1302+03	1.1301+03	1.0956+03	1.0974+03	1.0957+03
2	1.1344+03	1.1305+03	1.1301+03	1.0956+03	1.0975+03	1.0957+03
3	1.1346+03	1.1306+03	1.1301+03	1.0958+03	1.0976+03	1.0958+03
4	1.1481+03	1.1439+03	1.1439+03	1.1148+03	1.1167+03	1.1150+03
5	1.1481+03	1.1440+03	1.1439+03	1.1147+03	1.1167+03	1.1150+03
6	1.1483+03	1.1441+03	1.1441+03	1.1148+03	1.1167+03	1.1151+03
7	1.1509+03	1.1467+03	1.1466+03	1.1234+03	1.1252+03	1.1233+03
8	1.1510+03	1.1468+03	1.1468+03	1.1233+03	1.1252+03	1.1234+03
9	1.1510+03	1.1469+03	1.1468+03	1.1234+03	1.1252+03	1.1235+03
10	1.1547+03	1.1507+03	1.1509+03	1.1313+03	1.1329+03	1.1311+03
11	1.1547+03	1.1507+03	1.1510+03	1.1313+03	1.1329+03	1.1311+03
12	1.1547+03	1.1507+03	1.1509+03	1.1313+03	1.1331+03	1.1311+03
13	1.1489+03	1.1450+03	1.1452+03	1.1244+03	1.1261+03	1.1242+03
14	1.1489+03	1.1449+03	1.1450+03	1.1244+03	1.1260+03	1.1242+03
15	1.1488+03	1.1448+03	1.1452+03	1.1243+03	1.1259+03	1.1242+03
16	1.1465+03	1.1426+03	1.1428+03	1.1221+03	1.1238+03	1.1218+03
17	1.1465+03	1.1426+03	1.1428+03	1.1220+03	1.1236+03	1.1217+03
18	1.1465+03	1.1425+03	1.1428+03	1.1219+03	1.1235+03	1.1217+03
19	1.1419+03	1.1380+03	1.1381+03	1.1203+03	1.1219+03	1.1200+03
20	1.1420+03	1.1380+03	1.1381+03	1.1203+03	1.1219+03	1.1199+03

CONDENSING DATA REDUCTION

	142	144	146	148	150	152
	TC5	TC6	TC7	TC8	TC9	TC10
21	1.1420+03	1.1381+03	1.1381+03	1.1203+03	1.1219+03	1.1200+03
22	1.1414+03	1.1376+03	1.1377+03	1.1222+03	1.1239+03	1.1219+03
23	1.1413+03	1.1375+03	1.1377+03	1.1222+03	1.1239+03	1.1219+03
24	1.1414+03	1.1376+03	1.1375+03	1.1222+03	1.1239+03	1.1220+03
25	1.1461+03	1.1423+03	1.1424+03	1.1280+03	1.1297+03	1.1276+03
26	1.1462+03	1.1423+03	1.1424+03	1.1281+03	1.1297+03	1.1277+03
27	1.1461+03	1.1424+03	1.1425+03	1.1282+03	1.1297+03	1.1278+03
28	1.1475+03	1.1436+03	1.1436+03	1.1286+03	1.1303+03	1.1280+03
29	1.1475+03	1.1436+03	1.1436+03	1.1286+03	1.1302+03	1.1280+03
30	1.1475+03	1.1436+03	1.1436+03	1.1286+03	1.1302+03	1.1279+03
31	1.1496+03	1.1458+03	1.1459+03	1.1306+03	1.1323+03	1.1300+03
32	1.1497+03	1.1458+03	1.1458+03	1.1307+03	1.1323+03	1.1301+03
33	1.1497+03	1.1458+03	1.1459+03	1.1307+03	1.1324+03	1.1301+03

CONDENSING DATA REDUCTION

	154	156	158	160	162	164
	TC11	TC12	TC13	TC14	TC15	TC16
1	1.1501+03	1.1429+03	1.1435+03	1.1378+03	1.1336+03	1.1462+03
2	1.1501+03	1.1430+03	1.1436+03	1.1381+03	1.1336+03	1.1462+03
3	1.1503+03	1.1431+03	1.1437+03	1.1381+03	1.1339+03	1.1464+03
4	1.1662+03	1.1584+03	1.1588+03	1.1533+03	1.1487+03	1.1625+03
5	1.1663+03	1.1583+03	1.1588+03	1.1533+03	1.1489+03	1.1625+03
6	1.1664+03	1.1585+03	1.1589+03	1.1534+03	1.1488+03	1.1626+03
7	1.1712+03	1.1631+03	1.1635+03	1.1580+03	1.1534+03	1.1676+03
8	1.1712+03	1.1631+03	1.1635+03	1.1581+03	1.1533+03	1.1677+03
9	1.1714+03	1.1631+03	1.1634+03	1.1581+03	1.1534+03	1.1677+03
10	1.1764+03	1.1680+03	1.1682+03	1.1629+03	1.1583+03	1.1727+03
11	1.1763+03	1.1681+03	1.1682+03	1.1631+03	1.1583+03	1.1728+03
12	1.1764+03	1.1680+03	1.1681+03	1.1630+03	1.1582+03	1.1728+03
13	1.1712+03	1.1629+03	1.1629+03	1.1576+03	1.1526+03	1.1679+03
14	1.1712+03	1.1626+03	1.1627+03	1.1574+03	1.1525+03	1.1677+03
15	1.1711+03	1.1626+03	1.1627+03	1.1574+03	1.1525+03	1.1677+03
16	1.1690+03	1.1603+03	1.1605+03	1.1551+03	1.1502+03	1.1656+03
17	1.1690+03	1.1603+03	1.1604+03	1.1551+03	1.1502+03	1.1656+03
18	1.1689+03	1.1603+03	1.1603+03	1.1551+03	1.1501+03	1.1655+03
19	1.1656+03	1.1568+03	1.1569+03	1.1513+03	1.1463+03	1.1621+03
20	1.1656+03	1.1567+03	1.1568+03	1.1513+03	1.1463+03	1.1621+03

CONDENSING DATA REDUCTION

	154	156	158	160	162	164
	TC11	TC12	TC13	TC14	TC15	TC16
21	1.1655+03	1.1568+03	1.1568+03	1.1513+03	1.1462+03	1.1621+03
22	1.1657+03	1.1568+03	1.1568+03	1.1518+03	1.1464+03	1.1623+03
23	1.1657+03	1.1570+03	1.1568+03	1.1516+03	1.1466+03	1.1624+03
24	1.1656+03	1.1570+03	1.1568+03	1.1518+03	1.1465+03	1.1624+03
25	1.1705+03	1.1618+03	1.1615+03	1.1568+03	1.1513+03	1.1669+03
26	1.1705+03	1.1618+03	1.1616+03	1.1568+03	1.1514+03	1.1669+03
27	1.1706+03	1.1619+03	1.1616+03	1.1568+03	1.1514+03	1.1670+03
28	1.1729+03	1.1635+03	1.1635+03	1.1585+03	1.1530+03	1.1697+03
29	1.1728+03	1.1635+03	1.1634+03	1.1585+03	1.1530+03	1.1697+03
30	1.1728+03	1.1635+03	1.1634+03	1.1585+03	1.1529+03	1.1696+03
31	1.1754+03	1.1658+03	1.1656+03	1.1607+03	1.1555+03	1.1725+03
32	1.1753+03	1.1659+03	1.1659+03	1.1607+03	1.1552+03	1.1723+03
33	1.1753+03	1.1659+03	1.1659+03	1.1607+03	1.1553+03	1.1723+03

CONDENSING DATA REDUCTION

	166	168	170	172	174	801
	TC17	TC18	TC19	TC20	TKI	TC48
1	1.1394+03	1.1414+03	1.1335+03	1.1327+03	1.1507+03	1.1467+03
2	1.1393+03	1.1415+03	1.1336+03	1.1327+03	1.1506+03	1.1467+03
3	1.1396+03	1.1417+03	1.1337+03	1.1329+03	1.1508+03	1.1467+03
4	1.1551+03	1.1573+03	1.1504+03	1.1480+03	1.1667+03	1.1623+03
5	1.1551+03	1.1573+03	1.1505+03	1.1481+03	1.1667+03	1.1623+03
6	1.1553+03	1.1574+03	1.1506+03	1.1481+03	1.1667+03	1.1624+03
7	1.1599+03	1.1620+03	1.1553+03	1.1526+03	1.1716+03	1.1672+03
8	1.1600+03	1.1620+03	1.1554+03	1.1526+03	1.1719+03	1.1672+03
9	1.1600+03	1.1620+03	1.1554+03	1.1526+03	1.1718+03	1.1673+03
10	1.1650+03	1.1668+03	1.1604+03	1.1575+03	1.1771+03	1.1721+03
11	1.1650+03	1.1669+03	1.1604+03	1.1576+03	1.1767+03	1.1719+03
12	1.1648+03	1.1669+03	1.1603+03	1.1576+03	1.1770+03	1.1721+03
13	1.1597+03	1.1616+03	1.1549+03	1.1518+03	1.1721+03	1.1681+03
14	1.1595+03	1.1615+03	1.1547+03	1.1518+03	1.1723+03	1.1681+03
15	1.1595+03	1.1615+03	1.1547+03	1.1518+03	1.1724+03	1.1680+03
16	1.1574+03	1.1593+03	1.1525+03	1.1495+03	1.1700+03	1.1660+03
17	1.1573+03	1.1593+03	1.1524+03	1.1496+03	1.1701+03	1.1660+03
18	1.1573+03	1.1592+03	1.1525+03	1.1494+03	1.1701+03	1.1660+03
19	1.1538+03	1.1557+03	1.1489+03	1.1458+03	1.1666+03	1.1628+03
20	1.1537+03	1.1557+03	1.1489+03	1.1459+03	1.1667+03	1.1629+03

CONDENSING DATA REDUCTION

	166	168	170	172	174	801
	TC17	TC18	TC19	TC20	TKI	TC48
21	1.1538+03	1.1556+03	1.1490+03	1.1457+03	1.1665+03	1.1629+03
22	1.1538+03	1.1557+03	1.1492+03	1.1459+03	1.1670+03	1.1629+03
23	1.1539+03	1.1557+03	1.1492+03	1.1460+03	1.1668+03	1.1629+03
24	1.1539+03	1.1557+03	1.1492+03	1.1460+03	1.1667+03	1.1630+03
25	1.1586+03	1.1604+03	1.1540+03	1.1507+03	1.1713+03	1.1672+03
26	1.1585+03	1.1603+03	1.1540+03	1.1508+03	1.1712+03	1.1672+03
27	1.1586+03	1.1604+03	1.1541+03	1.1508+03	1.1713+03	1.1672+03
28	1.1609+03	1.1627+03	1.1561+03	1.1526+03	1.1750+03	1.1709+03
29	1.1608+03	1.1626+03	1.1561+03	1.1526+03	1.1753+03	1.1709+03
30	1.1607+03	1.1626+03	1.1560+03	1.1524+03	1.1754+03	1.1709+03
31	1.1633+03	1.1651+03	1.1585+03	1.1551+03	1.1782+03	1.1739+03
32	1.1634+03	1.1653+03	1.1585+03	1.1550+03	1.1784+03	1.1739+03
33	1.1634+03	1.1653+03	1.1585+03	1.1551+03	1.1783+03	1.1739+03

CONDENSING DATA REDUCTION

	176	181	183	185	187	189
	TKO	TC1C	TC2C	TC3C	TC4C	TC5C
1	1.1453+03	1.1565+03	1.1564+03	1.1601+03	1.1620+03	1.1367+03
2	1.1453+03	1.1563+03	1.1564+03	1.1604+03	1.1619+03	1.1367+03
3	1.1455+03	1.1565+03	1.1567+03	1.1605+03	1.1622+03	1.1369+03
4	1.1608+03	1.1727+03	1.1728+03	1.1761+03	1.1777+03	1.1504+03
5	1.1608+03	1.1727+03	1.1728+03	1.1762+03	1.1777+03	1.1504+03
6	1.1609+03	1.1727+03	1.1728+03	1.1762+03	1.1778+03	1.1506+03
7	1.1657+03	1.1777+03	1.1778+03	1.1811+03	1.1825+03	1.1532+03
8	1.1657+03	1.1779+03	1.1783+03	1.1811+03	1.1826+03	1.1533+03
9	1.1658+03	1.1779+03	1.1782+03	1.1812+03	1.1827+03	1.1533+03
10	1.1705+03	1.1832+03	1.1836+03	1.1860+03	1.1874+03	1.1570+03
11	1.1704+03	1.1829+03	1.1831+03	1.1860+03	1.1872+03	1.1570+03
12	1.1705+03	1.1831+03	1.1835+03	1.1860+03	1.1873+03	1.1570+03
13	1.1667+03	1.1783+03	1.1784+03	1.1822+03	1.1835+03	1.1512+03
14	1.1666+03	1.1783+03	1.1786+03	1.1821+03	1.1834+03	1.1512+03
15	1.1665+03	1.1784+03	1.1787+03	1.1821+03	1.1834+03	1.1511+03
16	1.1646+03	1.1761+03	1.1762+03	1.1801+03	1.1814+03	1.1488+03
17	1.1645+03	1.1761+03	1.1764+03	1.1800+03	1.1814+03	1.1488+03
18	1.1645+03	1.1762+03	1.1763+03	1.1800+03	1.1813+03	1.1488+03
19	1.1613+03	1.1726+03	1.1728+03	1.1767+03	1.1781+03	1.1442+03
20	1.1614+03	1.1727+03	1.1729+03	1.1768+03	1.1782+03	1.1443+03

CONDENSING DATA REDUCTION

	176	181	183	185	187	189
	TKO	TC1C	TC2C	TC3C	TC4C	TC5C
21	1.1614+03	1.1723+03	1.1729+03	1.1769+03	1.1781+03	1.1443+03
22	1.1614+03	1.1730+03	1.1732+03	1.1769+03	1.1782+03	1.1437+03
23	1.1614+03	1.1728+03	1.1728+03	1.1769+03	1.1782+03	1.1436+03
24	1.1614+03	1.1727+03	1.1728+03	1.1769+03	1.1782+03	1.1437+03
25	1.1657+03	1.1773+03	1.1776+03	1.1813+03	1.1824+03	1.1484+03
26	1.1657+03	1.1773+03	1.1774+03	1.1813+03	1.1824+03	1.1485+03
27	1.1657+03	1.1774+03	1.1776+03	1.1813+03	1.1825+03	1.1484+03
28	1.1695+03	1.1809+03	1.1817+03	1.1851+03	1.1861+03	1.1498+03
29	1.1694+03	1.1811+03	1.1820+03	1.1851+03	1.1861+03	1.1498+03
30	1.1694+03	1.1811+03	1.1822+03	1.1850+03	1.1861+03	1.1498+03
31	1.1724+03	1.1839+03	1.1852+03	1.1880+03	1.1890+03	1.1519+03
32	1.1724+03	1.1841+03	1.1853+03	1.1880+03	1.1890+03	1.1520+03
33	1.1724+03	1.1841+03	1.1853+03	1.1880+03	1.1890+03	1.1520+03

CONDENSING DATA REDUCTION

	191	193	195	197	199	201
	TC6C	TC7C	TC8C	TC9C	TC10C	TC11C
1	1.1333+03	1.1330+03	1.0960+03	1.0979+03	1.0988+03	1.1501+03
2	1.1336+03	1.1330+03	1.0960+03	1.0980+03	1.0988+03	1.1501+03
3	1.1337+03	1.1330+03	1.0962+03	1.0981+03	1.0990+03	1.1503+03
4	1.1471+03	1.1468+03	1.1152+03	1.1172+03	1.1181+03	1.1662+03
5	1.1471+03	1.1468+03	1.1152+03	1.1172+03	1.1182+03	1.1663+03
6	1.1472+03	1.1470+03	1.1152+03	1.1172+03	1.1182+03	1.1664+03
7	1.1498+03	1.1495+03	1.1238+03	1.1256+03	1.1265+03	1.1712+03
8	1.1499+03	1.1497+03	1.1238+03	1.1257+03	1.1265+03	1.1712+03
9	1.1500+03	1.1497+03	1.1238+03	1.1256+03	1.1266+03	1.1714+03
10	1.1539+03	1.1538+03	1.1317+03	1.1334+03	1.1343+03	1.1764+03
11	1.1539+03	1.1539+03	1.1317+03	1.1334+03	1.1343+03	1.1763+03
12	1.1539+03	1.1538+03	1.1317+03	1.1335+03	1.1343+03	1.1764+03
13	1.1481+03	1.1481+03	1.1249+03	1.1266+03	1.1274+03	1.1712+03
14	1.1480+03	1.1479+03	1.1248+03	1.1265+03	1.1273+03	1.1712+03
15	1.1479+03	1.1481+03	1.1247+03	1.1264+03	1.1273+03	1.1711+03
16	1.1458+03	1.1457+03	1.1225+03	1.1242+03	1.1250+03	1.1690+03
17	1.1457+03	1.1457+03	1.1224+03	1.1241+03	1.1249+03	1.1690+03
18	1.1457+03	1.1457+03	1.1223+03	1.1240+03	1.1248+03	1.1689+03
19	1.1411+03	1.1410+03	1.1208+03	1.1224+03	1.1232+03	1.1656+03
20	1.1411+03	1.1410+03	1.1207+03	1.1224+03	1.1231+03	1.1656+03

CONDENSING DATA REDUCTION

	191	193	195	197	199	201
	TC6C	TC7C	TC8C	TC9C	TC10C	TC11C
21	1.1412+03	1.1410+03	1.1207+03	1.1223+03	1.1231+03	1.1655+03
22	1.1407+03	1.1406+03	1.1227+03	1.1243+03	1.1251+03	1.1657+03
23	1.1407+03	1.1406+03	1.1226+03	1.1243+03	1.1251+03	1.1657+03
24	1.1407+03	1.1405+03	1.1227+03	1.1244+03	1.1252+03	1.1656+03
25	1.1454+03	1.1453+03	1.1284+03	1.1301+03	1.1308+03	1.1705+03
26	1.1455+03	1.1453+03	1.1285+03	1.1302+03	1.1309+03	1.1705+03
27	1.1455+03	1.1454+03	1.1286+03	1.1302+03	1.1309+03	1.1706+03
28	1.1467+03	1.1465+03	1.1291+03	1.1308+03	1.1312+03	1.1729+03
29	1.1467+03	1.1465+03	1.1291+03	1.1306+03	1.1311+03	1.1728+03
30	1.1467+03	1.1465+03	1.1290+03	1.1306+03	1.1311+03	1.1728+03
31	1.1489+03	1.1488+03	1.1310+03	1.1328+03	1.1332+03	1.1754+03
32	1.1489+03	1.1487+03	1.1311+03	1.1328+03	1.1332+03	1.1753+03
33	1.1489+03	1.1488+03	1.1311+03	1.1329+03	1.1333+03	1.1753+03

CONDENSING DATA REDUCTION

	203	205	207	209	211	213
	TC12C	TC13C	TC14C	TC15C	TC16C	TC17C
1	1.1439+03	1.1441+03	1.1387+03	1.1369+03	1.1496+03	1.1436+03
2	1.1440+03	1.1443+03	1.1391+03	1.1370+03	1.1496+03	1.1436+03
3	1.1442+03	1.1443+03	1.1390+03	1.1372+03	1.1498+03	1.1438+03
4	1.1592+03	1.1593+03	1.1542+03	1.1522+03	1.1659+03	1.1596+03
5	1.1591+03	1.1592+03	1.1542+03	1.1523+03	1.1659+03	1.1596+03
6	1.1594+03	1.1593+03	1.1542+03	1.1523+03	1.1660+03	1.1598+03
7	1.1639+03	1.1639+03	1.1588+03	1.1569+03	1.1710+03	1.1645+03
8	1.1639+03	1.1638+03	1.1590+03	1.1568+03	1.1711+03	1.1645+03
9	1.1639+03	1.1638+03	1.1590+03	1.1569+03	1.1711+03	1.1645+03
10	1.1688+03	1.1685+03	1.1638+03	1.1619+03	1.1761+03	1.1696+03
11	1.1689+03	1.1685+03	1.1639+03	1.1619+03	1.1762+03	1.1696+03
12	1.1688+03	1.1685+03	1.1638+03	1.1618+03	1.1762+03	1.1694+03
13	1.1636+03	1.1633+03	1.1584+03	1.1561+03	1.1713+03	1.1642+03
14	1.1634+03	1.1631+03	1.1583+03	1.1560+03	1.1711+03	1.1641+03
15	1.1634+03	1.1631+03	1.1583+03	1.1560+03	1.1711+03	1.1640+03
16	1.1612+03	1.1609+03	1.1560+03	1.1536+03	1.1690+03	1.1619+03
17	1.1612+03	1.1608+03	1.1559+03	1.1536+03	1.1690+03	1.1618+03
18	1.1611+03	1.1607+03	1.1559+03	1.1536+03	1.1689+03	1.1618+03
19	1.1577+03	1.1573+03	1.1522+03	1.1497+03	1.1655+03	1.1582+03
20	1.1576+03	1.1572+03	1.1522+03	1.1498+03	1.1655+03	1.1581+03

	203	205	207	209	211	213
	TC12C	TC13C	TC14C	TC15C	TC16C	TC17C
21	1.1576+03	1.1572+03	1.1522+03	1.1496+03	1.1655+03	1.1583+03
22	1.1577+03	1.1573+03	1.1526+03	1.1499+03	1.1657+03	1.1583+03
23	1.1579+03	1.1573+03	1.1525+03	1.1500+03	1.1658+03	1.1584+03
24	1.1579+03	1.1573+03	1.1527+03	1.1500+03	1.1658+03	1.1584+03
25	1.1626+03	1.1619+03	1.1576+03	1.1548+03	1.1703+03	1.1631+03
26	1.1626+03	1.1620+03	1.1576+03	1.1549+03	1.1703+03	1.1631+03
27	1.1627+03	1.1620+03	1.1577+03	1.1549+03	1.1704+03	1.1632+03
28	1.1643+03	1.1638+03	1.1594+03	1.1565+03	1.1731+03	1.1654+03
29	1.1643+03	1.1638+03	1.1593+03	1.1565+03	1.1731+03	1.1653+03
30	1.1642+03	1.1637+03	1.1593+03	1.1564+03	1.1730+03	1.1653+03
31	1.1666+03	1.1659+03	1.1615+03	1.1590+03	1.1759+03	1.1679+03
32	1.1667+03	1.1662+03	1.1615+03	1.1587+03	1.1757+03	1.1680+03
33	1.1667+03	1.1663+03	1.1616+03	1.1589+03	1.1757+03	1.1680+03

CONDENSING DATA REDUCTION

	215 TC18C	217 TC19C	219 TC20C	804 TC48C	221 TKICC
1	1.1438+03	1.1380+03	1.1358+03	1.1605+03	1.1534+03
2	1.1439+03	1.1381+03	1.1358+03	1.1605+03	1.1533+03
3	1.1441+03	1.1382+03	1.1360+03	1.1605+03	1.1536+03
4	1.1597+03	1.1551+03	1.1511+03	1.1764+03	1.1700+03
5	1.1597+03	1.1551+03	1.1512+03	1.1765+03	1.1701+03
6	1.1598+03	1.1552+03	1.1513+03	1.1766+03	1.1700+03
7	1.1643+03	1.1600+03	1.1558+03	1.1814+03	1.1751+03
8	1.1644+03	1.1601+03	1.1558+03	1.1814+03	1.1754+03
9	1.1644+03	1.1601+03	1.1558+03	1.1815+03	1.1754+03
10	1.1692+03	1.1652+03	1.1607+03	1.1862+03	1.1809+03
11	1.1693+03	1.1652+03	1.1609+03	1.1861+03	1.1805+03
12	1.1693+03	1.1651+03	1.1608+03	1.1862+03	1.1808+03
13	1.1640+03	1.1596+03	1.1550+03	1.1823+03	1.1754+03
14	1.1639+03	1.1595+03	1.1549+03	1.1823+03	1.1755+03
15	1.1638+03	1.1595+03	1.1549+03	1.1822+03	1.1756+03
16	1.1617+03	1.1572+03	1.1527+03	1.1802+03	1.1731+03
17	1.1617+03	1.1571+03	1.1527+03	1.1802+03	1.1733+03
18	1.1616+03	1.1572+03	1.1526+03	1.1802+03	1.1732+03
19	1.1581+03	1.1536+03	1.1489+03	1.1770+03	1.1695+03
20	1.1581+03	1.1535+03	1.1490+03	1.1771+03	1.1696+03

CONDENSING DATA REDUCTION

	215	217	219	804	221
	TC18C	TC19C	TC20C	TC48C	TKICC
21	1.1580+03	1.1536+03	1.1488+03	1.1770+03	1.1694+03
22	1.1581+03	1.1538+03	1.1490+03	1.1771+03	1.1699+03
23	1.1581+03	1.1539+03	1.1492+03	1.1771+03	1.1697+03
24	1.1581+03	1.1538+03	1.1491+03	1.1772+03	1.1696+03
25	1.1628+03	1.1587+03	1.1539+03	1.1814+03	1.1745+03
26	1.1627+03	1.1587+03	1.1540+03	1.1814+03	1.1744+03
27	1.1628+03	1.1588+03	1.1540+03	1.1814+03	1.1746+03
28	1.1651+03	1.1608+03	1.1557+03	1.1851+03	1.1783+03
29	1.1650+03	1.1608+03	1.1557+03	1.1851+03	1.1786+03
30	1.1649+03	1.1607+03	1.1556+03	1.1851+03	1.1787+03
31	1.1675+03	1.1633+03	1.1583+03	1.1881+03	1.1816+03
32	1.1677+03	1.1632+03	1.1582+03	1.1881+03	1.1818+03
33	1.1676+03	1.1633+03	1.1583+03	1.1881+03	1.1817+03

CONDENSING DATA REDUCTION

	223	226	229	230	235	237
	TKOC	TNAO	TNAI	DTNA	WNA	TNAM
1	1.1609+03	1.1343+03	1.0976+03	3.6752+01	1.8080+03	1.1160+03
2	1.1609+03	1.1344+03	1.0976+03	3.6851+01	1.8080+03	1.1160+03
3	1.1611+03	1.1345+03	1.0978+03	3.6782+01	1.8080+03	1.1162+03
4	1.1768+03	1.1481+03	1.1168+03	3.1261+01	2.2433+03	1.1325+03
5	1.1768+03	1.1481+03	1.1168+03	3.1261+01	2.2433+03	1.1325+03
6	1.1769+03	1.1483+03	1.1169+03	3.1402+01	2.2433+03	1.1326+03
7	1.1817+03	1.1508+03	1.1253+03	2.5515+01	2.7965+03	1.1381+03
8	1.1817+03	1.1510+03	1.1253+03	2.5657+01	2.7965+03	1.1382+03
9	1.1818+03	1.1510+03	1.1254+03	2.5614+01	2.7965+03	1.1382+03
10	1.1865+03	1.1549+03	1.1331+03	2.1759+01	3.3138+03	1.1440+03
11	1.1864+03	1.1549+03	1.1331+03	2.1830+01	3.3138+03	1.1440+03
12	1.1865+03	1.1549+03	1.1332+03	2.1717+01	3.3138+03	1.1440+03
13	1.1827+03	1.1491+03	1.1263+03	2.2871+01	3.3532+03	1.1377+03
14	1.1826+03	1.1490+03	1.1262+03	2.2829+01	3.3532+03	1.1376+03
15	1.1825+03	1.1490+03	1.1261+03	2.2928+01	3.3532+03	1.1376+03
16	1.1806+03	1.1467+03	1.1239+03	2.2829+01	3.3522+03	1.1353+03
17	1.1805+03	1.1467+03	1.1238+03	2.2928+01	3.3522+03	1.1353+03
18	1.1805+03	1.1467+03	1.1237+03	2.3013+01	3.3522+03	1.1352+03
19	1.1773+03	1.1421+03	1.1221+03	1.9990+01	3.8439+03	1.1321+03
20	1.1774+03	1.1422+03	1.1221+03	2.0103+01	3.8439+03	1.1321+03

CONDENSING DATA REDUCTION

	223 TKOC	226 TNAO	229 TNAI	230 DTNA	235 WNA	237 TNAM
21	1.1773+03	1.1422+03	1.1220+03	2.0131+01	3.8439+03	1.1321+03
22	1.1774+03	1.1417+03	1.1240+03	1.7645+01	4.3843+03	1.1328+03
23	1.1774+03	1.1416+03	1.1240+03	1.7631+01	4.3843+03	1.1328+03
24	1.1774+03	1.1416+03	1.1241+03	1.7518+01	4.3843+03	1.1328+03
25	1.1817+03	1.1464+03	1.1298+03	1.6586+01	4.5712+03	1.1381+03
26	1.1817+03	1.1464+03	1.1299+03	1.6572+01	4.5712+03	1.1381+03
27	1.1817+03	1.1464+03	1.1299+03	1.6515+01	4.5712+03	1.1382+03
28	1.1855+03	1.1477+03	1.1303+03	1.7349+01	4.5635+03	1.1390+03
29	1.1854+03	1.1477+03	1.1303+03	1.7405+01	4.5635+03	1.1390+03
30	1.1854+03	1.1477+03	1.1302+03	1.7433+01	4.5635+03	1.1389+03
31	1.1884+03	1.1499+03	1.1323+03	1.7546+01	4.5789+03	1.1411+03
32	1.1884+03	1.1499+03	1.1324+03	1.7490+01	4.5789+03	1.1411+03
33	1.1884+03	1.1499+03	1.1324+03	1.7462+01	4.5789+03	1.1412+03

CONDENSING DATA REDUCTION

	238	240	243	246	247	251
	CPNA	QNA	DTQL	QC	Q/AA	WK
1	3.0000-01	1.9934+04	1.0392+03	2.2402+04	4.5634+04	2.5655+01
2	3.0000-01	1.9988+04	1.0392+03	2.2456+04	4.5744+04	2.5717+01
3	3.0000-01	1.9950+04	1.0394+03	2.2419+04	4.5668+04	2.5675+01
4	3.0000-01	2.1039+04	1.0557+03	2.3570+04	4.8014+04	2.7064+01
5	3.0000-01	2.1039+04	1.0557+03	2.3570+04	4.8014+04	2.7064+01
6	3.0000-01	2.1134+04	1.0558+03	2.3665+04	4.8208+04	2.7174+01
7	3.0000-01	2.1406+04	1.0613+03	2.3959+04	4.8806+04	2.7533+01
8	3.0000-01	2.1525+04	1.0614+03	2.4078+04	4.9048+04	2.7670+01
9	3.0000-01	2.1489+04	1.0614+03	2.4042+04	4.8976+04	2.7630+01
10	3.0000-01	2.1632+04	1.0672+03	2.4208+04	4.9313+04	2.7843+01
11	3.0000-01	2.1702+04	1.0672+03	2.4278+04	4.9456+04	2.7923+01
12	3.0000-01	2.1590+04	1.0672+03	2.4166+04	4.9227+04	2.7794+01
13	3.0000-01	2.3008+04	1.0609+03	2.5559+04	5.2066+04	2.9375+01
14	3.0000-01	2.2965+04	1.0608+03	2.5516+04	5.1978+04	2.9326+01
15	3.0000-01	2.3065+04	1.0608+03	2.5616+04	5.2181+04	2.9440+01
16	3.0000-01	2.2958+04	1.0585+03	2.5500+04	5.1946+04	2.9297+01
17	3.0000-01	2.3058+04	1.0585+03	2.5600+04	5.2148+04	2.9411+01
18	3.0000-01	2.3143+04	1.0584+03	2.5685+04	5.2321+04	2.9509+01
19	3.0000-01	2.3052+04	1.0553+03	2.5582+04	5.2111+04	2.9374+01
20	3.0000-01	2.3182+04	1.0553+03	2.5712+04	5.2377+04	2.9524+01

CONDENSING DATA REDUCTION

	238	240	243	246	247	251
	CPNA	QNA	DTQL	QC	Q/AA	WK
21	3.0000-01	2.3215+04	1.0553+03	2.5744+04	5.2443+04	2.9561+01
22	3.0000-01	2.3209+04	1.0561+03	2.5741+04	5.2436+04	2.9558+01
23	3.0000-01	2.3190+04	1.0560+03	2.5722+04	5.2398+04	2.9536+01
24	3.0000-01	2.3041+04	1.0561+03	2.5574+04	5.2096+04	2.9366+01
25	3.0000-01	2.2745+04	1.0613+03	2.5298+04	5.1534+04	2.9071+01
26	3.0000-01	2.2726+04	1.0614+03	2.5279+04	5.1495+04	2.9049+01
27	3.0000-01	2.2649+04	1.0614+03	2.5202+04	5.1338+04	2.8960+01
28	3.0000-01	2.3751+04	1.0622+03	2.6308+04	5.3591+04	3.0249+01
29	3.0000-01	2.3829+04	1.0622+03	2.6385+04	5.3748+04	3.0339+01
30	3.0000-01	2.3867+04	1.0622+03	2.6424+04	5.3827+04	3.0383+01
31	3.0000-01	2.4103+04	1.0643+03	2.6667+04	5.4324+04	3.0678+01
32	3.0000-01	2.4025+04	1.0643+03	2.6590+04	5.4166+04	3.0590+01
33	3.0000-01	2.3987+04	1.0644+03	2.6551+04	5.4087+04	3.0545+01

CONDENSING DATA REDUCTION

	306	317	319	324	326	354
	TWI T	Q/A T	TWO T	HCON T	NUC T	TWI B
1	1.1553+03	3.8589+04	1.1282+03	-5.2352+03	-1.4629-02	1.1505+03
2	1.1553+03	3.8179+04	1.1285+03	-5.1893+03	-1.4501-02	1.1505+03
3	1.1555+03	3.8255+04	1.1286+03	-5.2231+03	-1.4596-02	1.1507+03
4	1.1716+03	4.0651+04	1.1431+03	-5.1984+03	-1.4549-02	1.1668+03
5	1.1715+03	4.0374+04	1.1432+03	-5.2474+03	-1.4687-02	1.1668+03
6	1.1717+03	4.0871+04	1.1431+03	-5.1417+03	-1.4391-02	1.1669+03
7	1.1766+03	4.1480+04	1.1476+03	-5.2034+03	-1.4571-02	1.1720+03
8	1.1766+03	4.1438+04	1.1476+03	-5.3237+03	-1.4908-02	1.1720+03
9	1.1766+03	4.1461+04	1.1476+03	-5.3230+03	-1.4906-02	1.1720+03
10	1.1817+03	4.1972+04	1.1523+03	-5.3518+03	-1.4994-02	1.1771+03
11	1.1816+03	4.1634+04	1.1525+03	-5.2027+03	-1.4576-02	1.1771+03
12	1.1817+03	4.1972+04	1.1523+03	-5.3180+03	-1.4899-02	1.1770+03
13	1.1768+03	4.3293+04	1.1465+03	-5.8470+03	-1.6374-02	1.1725+03
14	1.1767+03	4.3311+04	1.1464+03	-5.9791+03	-1.6744-02	1.1723+03
15	1.1766+03	4.3057+04	1.1464+03	-6.0508+03	-1.6945-02	1.1722+03
16	1.1745+03	4.3505+04	1.1440+03	-6.0261+03	-1.6872-02	1.1702+03
17	1.1744+03	4.3462+04	1.1440+03	-6.1089+03	-1.7104-02	1.1701+03
18	1.1744+03	4.3505+04	1.1440+03	-6.1121+03	-1.7113-02	1.1701+03
19	1.1713+03	4.4675+04	1.1400+03	-6.1123+03	-1.7108-02	1.1668+03
20	1.1711+03	4.4439+04	1.1400+03	-6.2774+03	-1.7570-02	1.1667+03

CONDENSING DATA REDUCTION

	306	317	319	324	326	354
	TWI T	Q/A T	TWO T	HCON T	NUC T	TWI B
21	1.1712+03	4.4583+04	1.1399+03	-6.1953+03	-1.7340-02	1.1669+03
22	1.1712+03	4.4222+04	1.1403+03	-6.2884+03	-1.7601-02	1.1669+03
23	1.1713+03	4.4272+04	1.1403+03	-6.1537+03	-1.7224-02	1.1669+03
24	1.1712+03	4.4021+04	1.1404+03	-6.1421+03	-1.7191-02	1.1670+03
25	1.1760+03	4.3948+04	1.1452+03	-5.8534+03	-1.6390-02	1.1714+03
26	1.1760+03	4.3861+04	1.1453+03	-5.8359+03	-1.6341-02	1.1714+03
27	1.1761+03	4.4038+04	1.1453+03	-5.8115+03	-1.6273-02	1.1715+03
28	1.1784+03	4.5451+04	1.1466+03	-7.3524+03	-2.0596-02	1.1745+03
29	1.1783+03	4.5237+04	1.1467+03	-7.6347+03	-2.1387-02	1.1744+03
30	1.1783+03	4.5451+04	1.1466+03	-7.6382+03	-2.1397-02	1.1743+03
31	1.1807+03	4.5477+04	1.1489+03	-8.3700+03	-2.3453-02	1.1771+03
32	1.1810+03	4.6130+04	1.1487+03	-8.2447+03	-2.3102-02	1.1771+03
33	1.1809+03	4.5824+04	1.1489+03	-8.2538+03	-2.3128-02	1.1770+03

CONDENSING DATA REDUCTION

	365	367	372	374	389	399
	Q/A B	TWO B	HCON B	NUC B	TWI TC	Q/A TC
1	3.3164+04	1.1271+03	-1.3344+04	-3.7288-02	1.1541+03	3.1880+04
2	3.3125+04	1.1272+03	-1.3059+04	-3.6492-02	1.1541+03	3.1469+04
3	3.3216+04	1.1273+03	-1.2894+04	-3.6031-02	1.1542+03	3.1542+04
4	3.4192+04	1.1429+03	-1.1077+04	-3.1002-02	1.1701+03	3.3497+04
5	3.3972+04	1.1430+03	-1.1330+04	-3.1711-02	1.1700+03	3.3218+04
6	3.4156+04	1.1430+03	-1.0842+04	-3.0345-02	1.1703+03	3.3713+04
7	3.5109+04	1.1474+03	-1.0486+04	-2.9364-02	1.1751+03	3.4174+04
8	3.5153+04	1.1474+03	-1.0787+04	-3.0206-02	1.1751+03	3.4132+04
9	3.5150+04	1.1474+03	-1.0943+04	-3.0642-02	1.1751+03	3.4154+04
10	3.5489+04	1.1523+03	-1.0834+04	-3.0354-02	1.1801+03	3.4581+04
11	3.5310+04	1.1524+03	-1.0063+04	-2.8193-02	1.1800+03	3.4243+04
12	3.5299+04	1.1523+03	-1.0863+04	-3.0435-02	1.1801+03	3.4582+04
13	3.7438+04	1.1463+03	-1.2209+04	-3.4191-02	1.1753+03	3.6006+04
14	3.7262+04	1.1462+03	-1.3019+04	-3.6458-02	1.1752+03	3.6030+04
15	3.7126+04	1.1462+03	-1.3372+04	-3.7449-02	1.1751+03	3.5776+04
16	3.7579+04	1.1439+03	-1.2775+04	-3.5768-02	1.1730+03	3.6298+04
17	3.7397+04	1.1439+03	-1.3338+04	-3.7344-02	1.1730+03	3.6255+04
18	3.7491+04	1.1439+03	-1.3309+04	-3.7262-02	1.1730+03	3.6301+04
19	3.8037+04	1.1401+03	-1.3366+04	-3.7411-02	1.1699+03	3.7591+04
20	3.7719+04	1.1402+03	-1.4393+04	-4.0285-02	1.1697+03	3.7356+04

CONDENSING DATA REDUCTION

	365	367	372	374	389	399
	Q/A B	TWO B	HCON B	NUC B	TWI TC	Q/A TC
21	3.8259+04	1.1401+03	-1.3135+04	-3.6764-02	1.1698+03	3.7503+04
22	3.7899+04	1.1403+03	-1.4364+04	-4.0206-02	1.1698+03	3.7136+04
23	3.7848+04	1.1404+03	-1.3442+04	-3.7625-02	1.1699+03	3.7181+04
24	3.7979+04	1.1403+03	-1.3102+04	-3.6671-02	1.1698+03	3.6931+04
25	3.7454+04	1.1452+03	-1.2654+04	-3.5434-02	1.1745+03	3.6702+04
26	3.7226+04	1.1453+03	-1.2835+04	-3.5940-02	1.1745+03	3.6614+04
27	3.7365+04	1.1453+03	-1.2708+04	-3.5585-02	1.1746+03	3.6790+04
28	3.9675+04	1.1467+03	-1.7718+04	-4.9633-02	1.1769+03	3.8150+04
29	3.9493+04	1.1467+03	-1.9639+04	-5.5014-02	1.1768+03	3.7936+04
30	3.9545+04	1.1466+03	-2.0699+04	-5.7984-02	1.1768+03	3.8152+04
31	3.9970+04	1.1492+03	-2.2098+04	-6.1921-02	1.1792+03	3.8130+04
32	4.0093+04	1.1491+03	-2.2930+04	-6.4253-02	1.1795+03	3.8789+04
33	3.9736+04	1.1492+03	-2.3794+04	-6.6672-02	1.1794+03	3.8481+04

CONDENSING DATA REDUCTION

	401	406	408	424	434	436
	TWO TC	HCONTC	NUC TC	TWI BC	Q/A BC	TWO BC
1	1.1317+03	1.0531+04	2.9455-02	1.1541+03	3.3510+04	1.1306+03
2	1.1320+03	1.0372+04	2.9010-02	1.1541+03	3.3471+04	1.1306+03
3	1.1321+03	1.0241+04	2.8645-02	1.1544+03	3.3566+04	1.1308+03
4	1.1467+03	1.0282+04	2.8805-02	1.1706+03	3.4540+04	1.1464+03
5	1.1468+03	9.8121+03	2.7489-02	1.1705+03	3.4319+04	1.1465+03
6	1.1467+03	1.0798+04	3.0252-02	1.1707+03	3.4504+04	1.1465+03
7	1.1512+03	1.0373+04	2.9074-02	1.1757+03	3.5441+04	1.1509+03
8	1.1512+03	9.8091+03	2.7495-02	1.1758+03	3.5484+04	1.1510+03
9	1.1512+03	9.8239+03	2.7536-02	1.1758+03	3.5481+04	1.1510+03
10	1.1560+03	9.6905+03	2.7176-02	1.1809+03	3.5790+04	1.1559+03
11	1.1561+03	1.0093+04	2.8304-02	1.1808+03	3.5609+04	1.1560+03
12	1.1560+03	9.8245+03	2.7552-02	1.1808+03	3.5599+04	1.1559+03
13	1.1501+03	9.6943+03	2.7174-02	1.1762+03	3.7780+04	1.1498+03
14	1.1500+03	9.2853+03	2.6028-02	1.1761+03	3.7602+04	1.1498+03
15	1.1500+03	8.9445+03	2.5073-02	1.1760+03	3.7466+04	1.1498+03
16	1.1476+03	9.5473+03	2.6756-02	1.1740+03	3.7931+04	1.1474+03
17	1.1476+03	9.2933+03	2.6045-02	1.1739+03	3.7748+04	1.1475+03
18	1.1476+03	9.3412+03	2.6179-02	1.1739+03	3.7842+04	1.1474+03
19	1.1435+03	1.0639+04	2.9807-02	1.1705+03	3.8402+04	1.1436+03
20	1.1436+03	9.9557+03	2.7892-02	1.1704+03	3.8082+04	1.1437+03

CONDENSING DATA REDUCTION

	401	406	408	424	434	436
	TWO TC	HCONTC	NUC TC	TWI BC	Q/A BC	TWO BC
21	1.1435+03	1.0343+04	2.8978-02	1.1706+03	3.8625+04	1.1436+03
22	1.1438+03	9.7557+03	2.7332-02	1.1706+03	3.8262+04	1.1438+03
23	1.1439+03	1.0211+04	2.8606-02	1.1707+03	3.8211+04	1.1439+03
24	1.1440+03	1.0032+04	2.8105-02	1.1707+03	3.8342+04	1.1438+03
25	1.1488+03	1.0217+04	2.8636-02	1.1752+03	3.7798+04	1.1488+03
26	1.1489+03	1.0214+04	2.8627-02	1.1751+03	3.7568+04	1.1488+03
27	1.1489+03	1.0409+04	2.9176-02	1.1752+03	3.7708+04	1.1488+03
28	1.1503+03	7.7033+03	2.1600-02	1.1782+03	4.0017+04	1.1503+03
29	1.1503+03	7.2834+03	2.0422-02	1.1781+03	3.9833+04	1.1503+03
30	1.1502+03	7.3627+03	2.0645-02	1.1781+03	3.9886+04	1.1502+03
31	1.1526+03	6.6114+03	1.8544-02	1.1809+03	4.0299+04	1.1527+03
32	1.1523+03	6.9068+03	1.9372-02	1.1809+03	4.0426+04	1.1526+03
33	1.1525+03	6.7959+03	1.9061-02	1.1808+03	4.0066+04	1.1528+03

CONDENSING DATA REDUCTION

	440	442	450	451	452	453
	HCONBC	NUC BC	PSI HD	PI	PO	DPC
1	1.0994+04	3.0750-02	1.5336-01	3.2707+00	3.1510+00	1.1970-01
2	1.1199+04	3.1322-02	1.5420-01	3.2687+00	3.1523+00	1.1647-01
3	1.1344+04	3.1730-02	1.5347-01	3.2737+00	3.1550+00	1.1864-01
4	1.2226+04	3.4250-02	1.5368-01	3.6508+00	3.5070+00	1.4378-01
5	1.1772+04	3.2980-02	1.5364-01	3.6518+00	3.5077+00	1.4413-01
6	1.2537+04	3.5124-02	1.5495-01	3.6508+00	3.5091+00	1.4168-01
7	1.3316+04	3.7324-02	1.5400-01	3.7731+00	3.6259+00	1.4718-01
8	1.2915+04	3.6200-02	1.5524-01	3.7814+00	3.6270+00	1.5444-01
9	1.2685+04	3.5556-02	1.5482-01	3.7803+00	3.6294+00	1.5089-01
10	1.2577+04	3.5273-02	1.5195-01	3.9167+00	3.7467+00	1.7004-01
11	1.3712+04	3.8454-02	1.5321-01	3.9073+00	3.7433+00	1.6394-01
12	1.2388+04	3.4740-02	1.5150-01	3.9145+00	3.7463+00	1.6819-01
13	1.3481+04	3.7790-02	1.7498-01	3.7881+00	3.6508+00	1.3731-01
14	1.2467+04	3.4948-02	1.7421-01	3.7920+00	3.6490+00	1.4294-01
15	1.2109+04	3.3944-02	1.7552-01	3.7936+00	3.6476+00	1.4600-01
16	1.3186+04	3.6955-02	1.7655-01	3.7321+00	3.5990+00	1.3311-01
17	1.2544+04	3.5155-02	1.7775-01	3.7365+00	3.5979+00	1.3857-01
18	1.2676+04	3.5524-02	1.7902-01	3.7348+00	3.5976+00	1.3725-01
19	1.3410+04	3.7570-02	1.8157-01	3.6492+00	3.5192+00	1.2996-01
20	1.2365+04	3.4642-02	1.8334-01	3.6518+00	3.5217+00	1.3014-01

CONDENSING DATA REDUCTION

	440	442	450	451	452	453
	HCONBC	NUC BC	PSI HD	PI	PO	DPC
21	1.3907+04	3.8961-02	1.8401-01	3.6476+00	3.5210+00	1.2664-01
22	1.2475+04	3.4950-02	1.8341-01	3.6592+00	3.5220+00	1.3713-01
23	1.3245+04	3.7107-02	1.8342-01	3.6534+00	3.5224+00	1.3101-01
24	1.3624+04	3.8168-02	1.8139-01	3.6508+00	3.5224+00	1.2839-01
25	1.2969+04	3.6351-02	1.7228-01	3.7659+00	3.6266+00	1.3927-01
26	1.2632+04	3.5406-02	1.7212-01	3.7637+00	3.6277+00	1.3600-01
27	1.2806+04	3.5895-02	1.7093-01	3.7665+00	3.6280+00	1.3842-01
28	1.1018+04	3.0893-02	1.8223-01	3.8635+00	3.7193+00	1.4415-01
29	1.0317+04	2.8928-02	1.8302-01	3.8701+00	3.7190+00	1.5116-01
30	1.0071+04	2.8239-02	1.8344-01	3.8729+00	3.7176+00	1.5533-01
31	9.8102+03	2.7516-02	1.8366-01	3.9456+00	3.7947+00	1.5082-01
32	9.6714+03	2.7126-02	1.8237-01	3.9500+00	3.7944+00	1.5563-01
33	9.4026+03	2.6372-02	1.8188-01	3.9489+00	3.7947+00	1.5415-01

CONDENSING DATA REDUCTION

	610	611	613	700	495	701
	PIC	POC	DPCC	X B	WKL B	X T
1	3.3348+00	3.5086+00	-1.7387-01	6.7480-01	8.3430+00	6.7480-01
2	3.3324+00	3.5101+00	-1.7770-01	6.7703-01	8.3058+00	6.7703-01
3	3.3378+00	3.5132+00	-1.7543-01	6.7560-01	8.3291+00	6.7560-01
4	3.7328+00	3.9081+00	-1.7536-01	6.4979-01	9.4781+00	6.4979-01
5	3.7340+00	3.9089+00	-1.7494-01	6.4950-01	9.4859+00	6.4950-01
6	3.7323+00	3.9104+00	-1.7811-01	6.5153-01	9.4694+00	6.5153-01
7	3.8647+00	4.0374+00	-1.7275-01	6.3051-01	1.0173+01	6.3051-01
8	3.8728+00	4.0386+00	-1.6574-01	6.2836-01	1.0283+01	6.2836-01
9	3.8718+00	4.0413+00	-1.6948-01	6.2934-01	1.0241+01	6.2934-01
10	4.0160+00	4.1712+00	-1.5518-01	6.1228-01	1.0795+01	6.1228-01
11	4.0052+00	4.1677+00	-1.6254-01	6.1563-01	1.0733+01	6.1563-01
12	4.0138+00	4.1708+00	-1.5705-01	6.1293-01	1.0758+01	6.1293-01
13	3.8723+00	4.0652+00	-1.9299-01	6.2463-01	1.1027+01	6.2463-01
14	3.8766+00	4.0633+00	-1.8669-01	6.2198-01	1.1086+01	6.2198-01
15	3.8778+00	4.0617+00	-1.8389-01	6.2135-01	1.1148+01	6.2135-01
16	3.8133+00	4.0073+00	-1.9394-01	6.2522-01	1.0980+01	6.2522-01
17	3.8175+00	4.0061+00	-1.8859-01	6.2344-01	1.1075+01	6.2344-01
18	3.8153+00	4.0057+00	-1.9042-01	6.2420-01	1.1089+01	6.2420-01
19	3.7208+00	3.9214+00	-2.0058-01	6.2007-01	1.1160+01	6.2007-01
20	3.7229+00	3.9240+00	-2.0113-01	6.2026-01	1.1211+01	6.2026-01

CONDENSING DATA REDUCTION

	610	611	613	700	495	701
	PIC	POC	DPCC	X B	WKL B	X T
21	3.7183+00	3.9233+00	-2.0500-01	6.2210-01	1.1171+01	6.2210-01
22	3.7305+00	3.9244+00	-1.9387-01	6.1226-01	1.1461+01	6.1226-01
23	3.7245+00	3.9248+00	-2.0027-01	6.1490-01	1.1375+01	6.1490-01
24	3.7225+00	3.9248+00	-2.0227-01	6.1555-01	1.1290+01	6.1555-01
25	3.8502+00	4.0382+00	-1.8806-01	6.0849-01	1.1381+01	6.0849-01
26	3.8479+00	4.0394+00	-1.9149-01	6.0995-01	1.1330+01	6.0995-01
27	3.8513+00	4.0398+00	-1.8854-01	6.0863-01	1.1334+01	6.0863-01
28	3.9481+00	4.1417+00	-1.9351-01	6.0302-01	1.2008+01	6.0302-01
29	3.9548+00	4.1413+00	-1.8647-01	6.0050-01	1.2120+01	6.0050-01
30	3.9575+00	4.1397+00	-1.8216-01	5.9908-01	1.2181+01	5.9908-01
31	4.0355+00	4.2219+00	-1.8639-01	5.9816-01	1.2328+01	5.9816-01
32	4.0408+00	4.2215+00	-1.8064-01	5.9612-01	1.2355+01	5.9612-01
33	4.0398+00	4.2219+00	-1.8206-01	5.9659-01	1.2322+01	5.9659-01

CONDENSING DATA REDUCTION

	498 WKL T	504 NREF T	507 NREF B
1	8.3430+00	5.5773+02	5.5773+02
2	8.3058+00	5.5524+02	5.5524+02
3	8.3291+00	5.5686+02	5.5686+02
4	9.4781+00	6.3954+02	6.3954+02
5	9.4859+00	6.4008+02	6.4008+02
6	9.4694+00	6.3896+02	6.3896+02
7	1.0173+01	6.8833+02	6.8833+02
8	1.0283+01	6.9586+02	6.9586+02
9	1.0241+01	6.9301+02	6.9301+02
10	1.0795+01	7.3277+02	7.3277+02
11	1.0733+01	7.2840+02	7.2840+02
12	1.0758+01	7.3025+02	7.3025+02
13	1.1027+01	7.4634+02	7.4634+02
14	1.1086+01	7.5038+02	7.5038+02
15	1.1148+01	7.5455+02	7.5455+02
16	1.0980+01	7.4228+02	7.4228+02
17	1.1075+01	7.4874+02	7.4874+02
18	1.1089+01	7.4968+02	7.4968+02
19	1.1160+01	7.5303+02	7.5303+02
20	1.1211+01	7.5654+02	7.5654+02

CONDENSING DATA REDUCTION

	498	504	507
	WKL T	NREF T	NREF B
21	1.1171+01	7.5377+02	7.5377+02
22	1.1461+01	7.7344+02	7.7344+02
23	1.1375+01	7.6756+02	7.6756+02
24	1.1290+01	7.6182+02	7.6182+02
25	1.1381+01	7.6997+02	7.6997+02
26	1.1330+01	7.6651+02	7.6651+02
27	1.1334+01	7.6679+02	7.6679+02
28	1.2008+01	8.1419+02	8.1419+02
29	1.2120+01	8.2185+02	8.2185+02
30	1.2181+01	8.2599+02	8.2599+02
31	1.2328+01	8.3747+02	8.3747+02
32	1.2355+01	8.3934+02	8.3934+02
33	1.2322+01	8.3713+02	8.3713+02

TABLE F-5. NOMENCLATURE FOR CONDENSING HEAT TRANSFER RESULTS FROM THE 50 KW FACILITY.
(Table F-6)

Column	Symbol	Identification	
131	DATE (e.g., 1.2063 + 04 = 12/6/63)		
132	TIME (e.g., 2.3000 + 03 = 2300)		
Fluid Thermocouples			
	TC Number		
134	1	Potassium inlet	
136	2	Potassium inlet	
138	3	Potassium outlet	
140	4	Potassium outlet	
142	5	Sodium outlet	
144	6	Sodium outlet	
146	7	Sodium outlet	
148	8	Sodium inlet	
150	9	Sodium inlet	
152	10	Sodium inlet	
Wall Thermocouples			
	TC Number	Radius Within Tube Wall - Inches	Distance from Condenser Inlet - Inches
154	11	0.398	12
156	12	0.449	12
158	13	0.518	12
160	14	0.601	12
162	15	0.698	12
164	16	0.398	24
166	17	0.449	24
168	18	0.518	24
170	19	0.601	24
172	20	0.698	24

Column	Symbol	Identification
174	TKI	Inlet potassium temperature, ^{o}F
176	TKO	Outlet potassium temperature, ^{o}F
181-219	TKNC	Corrected temperature of thermocouple N, ^{o}F
221	TKIC	Corrected inlet potassium temperature, ^{o}F
223	TKOC	Corrected outlet potassium temperature, ^{o}F
226	TNAO	Outlet Sodium temperature, ^{o}F
229	TNAI	Inlet Sodium temperature, ^{o}F
230	DTNA	Sodium temperature increase, ^{o}F
235	WNA	Sodium Flow rate, lb/hr
237	TNAM	Sodium mean temperature, ^{o}F
238	CPNA	Sodium specific heat, Btu/lb-^{o}F
240	QNA	Sodium heat gain, Btu/hr
243	DTQL	Temperature Difference, Test Section Shell - Ambient, ^{o}F
246	QC	Condenser load, Btu/hr
247	Q/AA	Average heat flux, Btu/hr-ft^2
251	WK	Potassium flow rate, lb/hr
306	TWIT*	Inner wall temperature at top axial station, ^{o}F
317	Q/AT*	Heat flux at inner wall at top axial station, Btu/hr-ft^2
319	TWOT*	Outer wall temperature at top axial station, ^{o}F
324	HCONT*	Condensing heat transfer coefficient at top axial station, Btu/hr-ft^2 ^{o}F
326	NUCT*	Nusselt's condensing ratio at top axial station, dimensionless
354	TWIB*	Inner wall temperature at bottom axial station, ^{o}F
365	Q/AB*	Heat flux at inner wall at bottom axial station, Btu/hr-ft^2
367	TWOB*	Outer wall temperature at bottom axial station, ^{o}F
372	HCONB*	Condensing heat transfer coefficient at bottom axial station, Btu/hr-ft^2 ^{o}F
374	NUCB*	Nusselt's condensing ratio at bottom axial station, dimensionless
450	PSI HD	Inlet vapor velocity head, psi
451	PI*	Inlet potassium vapor pressure, lb/in^2
452	PO*	Outlet potassium vapor pressure, lb/in^2
453	DPC*	Condensing pressure drop

*These values were also calculated, accounting for the thermocouple standardizations obtained in the vapor standardization runs. The values of the parameters utilizing the thermocouple standardization are indicated in the columns in which the notation for the above parameters are followed by a C, e.g., TWITC is the Inner Wall Temperature at top axial station utilizing the standardized correction factor, ^{o}F.

Column	Symbol	Identification
700	X B	Potassium Quality, Bottom Station, L/D = 38
495	WKL B	Local Potassium liquid flowrate at bottom station, lb/hr
701	X T	Potassium Quality, Top Station, L/D = 19
498	WKL T	Local Potassium liquid flowrate at top station, lb/hr
504	NREF T	Liquid film Reynolds number at top station, L/D = 19
507	NREF B	Liquid film Reynolds number at bottom station, L/D = 38

TABLE F-6. 50 KW CONDENSING DATA

CONDENSING DATA REDUCTION

	131	132	134	136	138	140
	DATE	TIME	TC1	TC2	TC3	TC4
1	1.2063+04	2.3000+03	1.1688+03	1.1684+03	1.1661+03	1.1671+03
2	1.2063+04	2.3000+03	1.1687+03	1.1684+03	1.1662+03	1.1671+03
3	1.2063+04	2.3000+03	1.1687+03	1.1685+03	1.1662+03	1.1671+03
4	1.2063+04	2.3000+03	1.1688+03	1.1686+03	1.1662+03	1.1671+03
5	1.2073+04	2.0000+01	1.2041+03	1.2039+03	1.2020+03	1.2031+03
6	1.2073+04	2.0000+01	1.2042+03	1.2038+03	1.2022+03	1.2032+03
7	1.2073+04	2.0000+01	1.2043+03	1.2041+03	1.2021+03	1.2032+03
8	1.2073+04	2.0000+01	1.2042+03	1.2040+03	1.2021+03	1.2032+03
9	1.2073+04	1.3000+02	1.2370+03	1.2368+03	1.2355+03	1.2364+03
10	1.2073+04	1.3000+02	1.2372+03	1.2370+03	1.2355+03	1.2364+03
11	1.2073+04	1.3000+02	1.2370+03	1.2368+03	1.2354+03	1.2364+03
12	1.2073+04	1.3000+02	1.2371+03	1.2370+03	1.2356+03	1.2365+03
13	1.2073+04	2.2000+02	1.2584+03	1.2580+03	1.2568+03	1.2577+03
14	1.2073+04	2.2000+02	1.2585+03	1.2582+03	1.2569+03	1.2579+03
15	1.2073+04	2.2000+02	1.2584+03	1.2582+03	1.2568+03	1.2578+03
16	1.2073+04	2.3000+02	1.2580+03	1.2578+03	1.2565+03	1.2574+03
17	1.2073+04	2.3000+02	1.2579+03	1.2575+03	1.2565+03	1.2573+03
18	1.2073+04	2.3000+02	1.2581+03	1.2578+03	1.2565+03	1.2574+03

CONDENSING DATA REDUCTION

	142	144	146	148	150	152
	TC5	TC6	TC7	TC8	TC9	TC10
1	1.1469+03	1.1449+03	1.1457+03	1.1409+03	1.1376+03	1.1392+03
2	1.1469+03	1.1449+03	1.1458+03	1.1409+03	1.1377+03	1.1392+03
3	1.1468+03	1.1449+03	1.1459+03	1.1408+03	1.1377+03	1.1392+03
4	1.1470+03	1.1450+03	1.1459+03	1.1409+03	1.1376+03	1.1392+03
5	1.1843+03	1.1824+03	1.1834+03	1.1800+03	1.1768+03	1.1784+03
6	1.1844+03	1.1824+03	1.1833+03	1.1801+03	1.1766+03	1.1782+03
7	1.1843+03	1.1823+03	1.1834+03	1.1800+03	1.1767+03	1.1783+03
8	1.1842+03	1.1823+03	1.1833+03	1.1799+03	1.1766+03	1.1782+03
9	1.2181+03	1.2161+03	1.2172+03	1.2142+03	1.2109+03	1.2125+03
10	1.2181+03	1.2161+03	1.2172+03	1.2142+03	1.2107+03	1.2124+03
11	1.2181+03	1.2160+03	1.2171+03	1.2141+03	1.2106+03	1.2123+03
12	1.2181+03	1.2160+03	1.2172+03	1.2141+03	1.2106+03	1.2123+03
13	1.2388+03	1.2365+03	1.2376+03	1.2343+03	1.2309+03	1.2326+03
14	1.2387+03	1.2366+03	1.2376+03	1.2344+03	1.2309+03	1.2325+03
15	1.2385+03	1.2365+03	1.2376+03	1.2342+03	1.2308+03	1.2325+03
16	1.2379+03	1.2359+03	1.2370+03	1.2335+03	1.2301+03	1.2318+03
17	1.2381+03	1.2359+03	1.2369+03	1.2335+03	1.2301+03	1.2319+03
18	1.2380+03	1.2359+03	1.2369+03	1.2335+03	1.2300+03	1.2317+03

CONDENSING DATA REDUCTION

	154	156	158	160	162	164
	TC11	TC12	TC13	TC14	TC15	TC16
1	1.1610+03	1.1603+03	1.1578+03	1.1565+03	0.	1.1596+03
2	1.1610+03	1.1604+03	1.1578+03	1.1566+03	0.	1.1597+03
3	1.1610+03	1.1605+03	1.1579+03	1.1566+03	0.	1.1597+03
4	1.1611+03	1.1604+03	1.1578+03	1.1565+03	0.	1.1595+03
5	1.1979+03	1.1974+03	1.1951+03	1.1940+03	0.	1.1966+03
6	1.1982+03	1.1976+03	1.1950+03	1.1939+03	0.	1.1966+03
7	1.1980+03	1.1975+03	1.1952+03	1.1940+03	0.	1.1966+03
8	1.1979+03	1.1974+03	1.1951+03	1.1940+03	0.	1.1965+03
9	1.2318+03	1.2314+03	1.2289+03	1.2278+03	0.	1.2303+03
10	1.2319+03	1.2313+03	1.2289+03	1.2277+03	0.	1.2303+03
11	1.2318+03	1.2312+03	1.2288+03	1.2278+03	0.	1.2303+03
12	1.2319+03	1.2314+03	1.2289+03	1.2277+03	0.	1.2303+03
13	1.2529+03	1.2523+03	1.2499+03	1.2487+03	0.	1.2514+03
14	1.2531+03	1.2524+03	1.2497+03	1.2486+03	0.	1.2515+03
15	1.2530+03	1.2524+03	1.2498+03	1.2485+03	0.	1.2513+03
16	1.2526+03	1.2519+03	1.2492+03	1.2480+03	0.	1.2509+03
17	1.2524+03	1.2518+03	1.2493+03	1.2481+03	0.	1.2509+03
18	1.2525+03	1.2517+03	1.2492+03	1.2481+03	0.	1.2510+03

CONDENSING DATA REDUCTION

	166	168	170	172	174	176
	TC17	TC18	TC19	TC20	TKI	TKO
1	1.1575+03	1.1569+03	1.1523+03	0.	1.1686+03	1.1666+03
2	1.1575+03	1.1569+03	1.1523+03	0.	1.1685+03	1.1666+03
3	1.1575+03	1.1570+03	1.1524+03	0.	1.1686+03	1.1667+03
4	1.1576+03	1.1570+03	1.1524+03	0.	1.1687+03	1.1666+03
5	1.1947+03	1.1941+03	1.1900+03	0.	1.2040+03	1.2025+03
6	1.1948+03	1.1943+03	1.1902+03	0.	1.2040+03	1.2027+03
7	1.1947+03	1.1942+03	1.1900+03	0.	1.2042+03	1.2027+03
8	1.1947+03	1.1941+03	1.1900+03	0.	1.2041+03	1.2026+03
9	1.2286+03	1.2279+03	1.2241+03	0.	1.2369+03	1.2359+03
10	1.2286+03	1.2280+03	1.2240+03	0.	1.2371+03	1.2360+03
11	1.2287+03	1.2279+03	1.2239+03	0.	1.2369+03	1.2359+03
12	1.2287+03	1.2280+03	1.2240+03	0.	1.2371+03	1.2360+03
13	1.2496+03	1.2488+03	1.2448+03	0.	1.2582+03	1.2572+03
14	1.2497+03	1.2488+03	1.2447+03	0.	1.2584+03	1.2574+03
15	1.2496+03	1.2488+03	1.2447+03	0.	1.2583+03	1.2573+03
16	1.2491+03	1.2482+03	1.2441+03	0.	1.2579+03	1.2569+03
17	1.2490+03	1.2482+03	1.2441+03	0.	1.2577+03	1.2569+03
18	1.2490+03	1.2482+03	1.2440+03	0.	1.2579+03	1.2569+03

CONDENSING DATA REDUCTION

	181 TC1C	183 TC2C	185 TC3C	187 TC4C	189 TC5C	191 TC6C
1	1.1688+03	1.1684+03	1.1674+03	1.1670+03	1.1448+03	1.1492+03
2	1.1687+03	1.1684+03	1.1674+03	1.1670+03	1.1447+03	1.1491+03
3	1.1687+03	1.1685+03	1.1675+03	1.1670+03	1.1446+03	1.1492+03
4	1.1688+03	1.1686+03	1.1675+03	1.1670+03	1.1448+03	1.1493+03
5	1.2041+03	1.2040+03	1.2032+03	1.2030+03	1.1821+03	1.1866+03
6	1.2042+03	1.2039+03	1.2034+03	1.2031+03	1.1822+03	1.1866+03
7	1.2043+03	1.2042+03	1.2034+03	1.2032+03	1.1821+03	1.1865+03
8	1.2042+03	1.2041+03	1.2034+03	1.2031+03	1.1820+03	1.1865+03
9	1.2370+03	1.2370+03	1.2366+03	1.2364+03	1.2159+03	1.2203+03
10	1.2372+03	1.2372+03	1.2367+03	1.2364+03	1.2159+03	1.2203+03
11	1.2370+03	1.2370+03	1.2366+03	1.2363+03	1.2159+03	1.2203+03
12	1.2371+03	1.2372+03	1.2368+03	1.2364+03	1.2159+03	1.2203+03
13	1.2584+03	1.2582+03	1.2579+03	1.2577+03	1.2366+03	1.2407+03
14	1.2585+03	1.2584+03	1.2580+03	1.2578+03	1.2365+03	1.2408+03
15	1.2584+03	1.2584+03	1.2579+03	1.2578+03	1.2363+03	1.2407+03
16	1.2580+03	1.2580+03	1.2576+03	1.2574+03	1.2358+03	1.2402+03
17	1.2579+03	1.2577+03	1.2576+03	1.2572+03	1.2359+03	1.2401+03
18	1.2581+03	1.2580+03	1.2576+03	1.2573+03	1.2358+03	1.2402+03

CONDENSING DATA REDUCTION

	193	195	197	199	201	203
	TC7C	TC8C	TC9C	TC10C	TC11C	TC12C
1	1.1480+03	1.1409+03	1.1388+03	1.1420+03	1.1605+03	1.1596+03
2	1.1481+03	1.1409+03	1.1389+03	1.1420+03	1.1605+03	1.1596+03
3	1.1482+03	1.1408+03	1.1389+03	1.1420+03	1.1605+03	1.1597+03
4	1.1482+03	1.1409+03	1.1388+03	1.1420+03	1.1606+03	1.1597+03
5	1.1857+03	1.1800+03	1.1779+03	1.1812+03	1.1974+03	1.1967+03
6	1.1856+03	1.1801+03	1.1778+03	1.1811+03	1.1976+03	1.1969+03
7	1.1857+03	1.1800+03	1.1778+03	1.1811+03	1.1975+03	1.1968+03
8	1.1856+03	1.1799+03	1.1777+03	1.1810+03	1.1974+03	1.1967+03
9	1.2195+03	1.2142+03	1.2120+03	1.2153+03	1.2313+03	1.2307+03
10	1.2195+03	1.2142+03	1.2119+03	1.2152+03	1.2314+03	1.2306+03
11	1.2194+03	1.2141+03	1.2117+03	1.2151+03	1.2313+03	1.2305+03
12	1.2195+03	1.2141+03	1.2117+03	1.2151+03	1.2314+03	1.2307+03
13	1.2399+03	1.2343+03	1.2320+03	1.2355+03	1.2523+03	1.2516+03
14	1.2400+03	1.2344+03	1.2320+03	1.2353+03	1.2525+03	1.2517+03
15	1.2399+03	1.2342+03	1.2320+03	1.2353+03	1.2525+03	1.2517+03
16	1.2393+03	1.2335+03	1.2312+03	1.2346+03	1.2520+03	1.2512+03
17	1.2392+03	1.2335+03	1.2312+03	1.2347+03	1.2518+03	1.2511+03
18	1.2392+03	1.2335+03	1.2311+03	1.2345+03	1.2520+03	1.2510+03

CONDENSING DATA REDUCTION

	205	207	209	211	213	215
	TC13C	TC14C	TC15C	TC16C	TC17C	TC18C
1	1.1571+03	1.1554+03	0.	1.1599+03	1.1574+03	1.1571+03
2	1.1571+03	1.1555+03	0.	1.1600+03	1.1574+03	1.1571+03
3	1.1572+03	1.1554+03	0.	1.1600+03	1.1574+03	1.1571+03
4	1.1571+03	1.1554+03	0.	1.1598+03	1.1575+03	1.1571+03
5	1.1944+03	1.1929+03	0.	1.1968+03	1.1946+03	1.1943+03
6	1.1943+03	1.1928+03	0.	1.1968+03	1.1947+03	1.1945+03
7	1.1945+03	1.1929+03	0.	1.1969+03	1.1946+03	1.1944+03
8	1.1944+03	1.1929+03	0.	1.1968+03	1.1945+03	1.1943+03
9	1.2282+03	1.2267+03	0.	1.2305+03	1.2284+03	1.2281+03
10	1.2281+03	1.2267+03	0.	1.2305+03	1.2284+03	1.2283+03
11	1.2280+03	1.2267+03	0.	1.2305+03	1.2285+03	1.2281+03
12	1.2282+03	1.2267+03	0.	1.2305+03	1.2285+03	1.2282+03
13	1.2491+03	1.2477+03	0.	1.2516+03	1.2494+03	1.2490+03
14	1.2490+03	1.2476+03	0.	1.2516+03	1.2495+03	1.2491+03
15	1.2491+03	1.2475+03	0.	1.2515+03	1.2494+03	1.2490+03
16	1.2484+03	1.2470+03	0.	1.2511+03	1.2489+03	1.2485+03
17	1.2485+03	1.2471+03	0.	1.2511+03	1.2488+03	1.2484+03
18	1.2484+03	1.2471+03	0.	1.2512+03	1.2488+03	1.2485+03

CONDENSING DATA REDUCTION

	217	219	221	223	226	229
	TC19C	TC20C	TKICC	TKOC	TNAO	TNAI
1	1.1519+03	0.	1.1654+03	1.1672+03	1.1473+03	1.1406+03
2	1.1519+03	0.	1.1654+03	1.1672+03	1.1473+03	1.1406+03
3	1.1520+03	0.	1.1653+03	1.1673+03	1.1473+03	1.1406+03
4	1.1520+03	0.	1.1654+03	1.1672+03	1.1474+03	1.1406+03
5	1.1896+03	0.	1.2022+03	1.2031+03	1.1848+03	1.1797+03
6	1.1897+03	0.	1.2022+03	1.2033+03	1.1848+03	1.1797+03
7	1.1896+03	0.	1.2023+03	1.2033+03	1.1848+03	1.1796+03
8	1.1896+03	0.	1.2023+03	1.2032+03	1.1847+03	1.1795+03
9	1.2236+03	0.	1.2357+03	1.2365+03	1.2186+03	1.2138+03
10	1.2235+03	0.	1.2359+03	1.2365+03	1.2186+03	1.2138+03
11	1.2234+03	0.	1.2357+03	1.2364+03	1.2185+03	1.2136+03
12	1.2235+03	0.	1.2358+03	1.2366+03	1.2186+03	1.2137+03
13	1.2443+03	0.	1.2572+03	1.2578+03	1.2391+03	1.2339+03
14	1.2442+03	0.	1.2573+03	1.2579+03	1.2391+03	1.2339+03
15	1.2442+03	0.	1.2572+03	1.2578+03	1.2390+03	1.2338+03
16	1.2435+03	0.	1.2569+03	1.2575+03	1.2384+03	1.2331+03
17	1.2436+03	0.	1.2567+03	1.2574+03	1.2384+03	1.2331+03
18	1.2435+03	0.	1.2568+03	1.2575+03	1.2384+03	1.2330+03

CONDENSING DATA REDUCTION

	230	235	237	238	240	243
	DTNA	WNA	TNAM	CPNA	QNA	DTQL
1	6.7328+00	3.9151+03	1.1439+03	3.0000-01	7.9080+03	1.0618+03
2	6.7187+00	3.9151+03	1.1439+03	3.0000-01	7.8914+03	1.0622+03
3	6.7752+00	3.9151+03	1.1439+03	3.0000-01	7.9577+03	1.0627+03
4	6.8600+00	3.9151+03	1.1440+03	3.0000-01	8.0573+03	1.0632+03
5	5.0941+00	4.4514+03	1.1823+03	3.0000-01	6.8027+03	1.1055+03
6	5.1653+00	4.4514+03	1.1822+03	3.0000-01	6.8978+03	1.1055+03
7	5.1510+00	4.4514+03	1.1822+03	3.0000-01	6.8788+03	1.1059+03
8	5.1795+00	4.4514+03	1.1821+03	3.0000-01	6.9169+03	1.1058+03
9	4.7522+00	4.4929+03	1.2162+03	3.0008-01	6.4071+03	1.1350+03
10	4.8092+00	4.4929+03	1.2162+03	3.0008-01	6.4839+03	1.1354+03
11	4.8946+00	4.4929+03	1.2161+03	3.0008-01	6.5991+03	1.1353+03
12	4.8946+00	4.4929+03	1.2161+03	3.0008-01	6.5991+03	1.1353+03
13	5.1510+00	4.5153+03	1.2365+03	3.0018-01	6.9818+03	1.1575+03
14	5.1938+00	4.5153+03	1.2365+03	3.0018-01	7.0397+03	1.1570+03
15	5.1510+00	4.5153+03	1.2364+03	3.0018-01	6.9818+03	1.1574+03
16	5.2935+00	4.5167+03	1.2358+03	3.0018-01	7.1769+03	1.1567+03
17	5.2792+00	4.5167+03	1.2358+03	3.0018-01	7.1576+03	1.1568+03
18	5.3647+00	4.5167+03	1.2357+03	3.0018-01	7.2735+03	1.1567+03

CONDENSING DATA REDUCTION

	246	247	251	306	317	319
	QC	Q/AA	WK	TWI T	Q/A T	TWO T
1	1.0463+04	2.1313+04	1.2000+01	1.1640+03	1.6663+04	1.1523+03
2	1.0448+04	2.1283+04	1.1983+01	1.1640+03	1.6448+04	1.1525+03
3	1.0516+04	2.1422+04	1.2061+01	1.1641+03	1.6603+04	1.1524+03
4	1.0617+04	2.1628+04	1.2177+01	1.1642+03	1.7074+04	1.1522+03
5	9.5291+03	1.9411+04	1.0994+01	1.2007+03	1.4963+04	1.1903+03
6	9.6241+03	1.9605+04	1.1104+01	1.2011+03	1.6129+04	1.1899+03
7	9.6067+03	1.9570+04	1.1084+01	1.2007+03	1.5102+04	1.1903+03
8	9.6445+03	1.9647+04	1.1127+01	1.2007+03	1.5144+04	1.1902+03
9	9.2517+03	1.8846+04	1.0732+01	1.2347+03	1.5636+04	1.2239+03
10	9.3302+03	1.9006+04	1.0823+01	1.2347+03	1.5986+04	1.2237+03
11	9.4450+03	1.9240+04	1.0956+01	1.2346+03	1.5650+04	1.2238+03
12	9.4451+03	1.9240+04	1.0957+01	1.2348+03	1.6038+04	1.2238+03
13	9.9180+03	2.0204+04	1.1549+01	1.2557+03	1.5973+04	1.2448+03
14	9.9741+03	2.0318+04	1.1614+01	1.2561+03	1.7145+04	1.2443+03
15	9.9176+03	2.0203+04	1.1548+01	1.2561+03	1.7218+04	1.2443+03
16	1.0110+04	2.0595+04	1.1772+01	1.2556+03	1.7467+04	1.2437+03
17	1.0091+04	2.0556+04	1.1749+01	1.2552+03	1.6243+04	1.2441+03
18	1.0207+04	2.0791+04	1.1884+01	1.2554+03	1.6714+04	1.2439+03

CONDENSING DATA REDUCTION

	324	326	354	365	367	372
	HCON T	NUC T	TWI B	Q/A B	TWO B	HCON B
1	4.2120+03	1.1794-02	1.1638+03	2.3673+04	1.1472+03	6.7964+03
2	4.1819+03	1.1709-02	1.1639+03	2.3844+04	1.1472+03	7.0520+03
3	4.2771+03	1.1976-02	1.1638+03	2.3526+04	1.1473+03	6.7571+03
4	4.4197+03	1.2375-02	1.1637+03	2.3328+04	1.1474+03	6.4621+03
5	5.2489+03	1.4753-02	1.2004+03	2.1600+04	1.1854+03	8.1785+03
6	6.3837+03	1.7943-02	1.2003+03	2.0936+04	1.1858+03	7.3574+03
7	5.1360+03	1.4436-02	1.2004+03	2.1506+04	1.1855+03	7.7270+03
8	5.1788+03	1.4557-02	1.2003+03	2.1238+04	1.1855+03	7.4324+03
9	8.1376+03	2.3008-02	1.2340+03	2.0899+04	1.2196+03	9.2295+03
10	8.0731+03	2.2825-02	1.2340+03	2.0912+04	1.2196+03	9.0514+03
11	7.9135+03	2.2374-02	1.2341+03	2.1432+04	1.2194+03	1.0167+04
12	8.3921+03	2.3728-02	1.2341+03	2.1057+04	1.2196+03	9.1601+03
13	7.3589+03	2.0884-02	1.2553+03	2.2234+04	1.2400+03	9.7379+03
14	8.7341+03	2.4787-02	1.2554+03	2.2707+04	1.2399+03	9.9738+03
15	9.1916+03	2.6086-02	1.2552+03	2.2252+04	1.2400+03	9.3324+03
16	8.9026+03	2.5264-02	1.2550+03	2.3029+04	1.2392+03	9.9320+03
17	7.3727+03	2.0922-02	1.2549+03	2.2766+04	1.2392+03	9.9552+03
18	7.5199+03	2.1340-02	1.2550+03	2.3329+04	1.2390+03	1.0484+04

CONDENSING DATA REDUCTION

	374	389	399	401	406	408
	NUC B	TWI TC	Q/A TC	TWO TC	HCONTC	NUC TC
1	1.9029-02	1.1638+03	1.8683+04	1.1507+03	8.5918+03	2.4052-02
2	1.9744-02	1.1638+03	1.8467+04	1.1509+03	8.5623+03	2.3970-02
3	1.8919-02	1.1639+03	1.8623+04	1.1509+03	8.9464+03	2.5045-02
4	1.8093-02	1.1640+03	1.9093+04	1.1506+03	9.4143+03	2.6355-02
5	2.2986-02	1.2005+03	1.6826+04	1.1888+03	8.2401+03	2.3157-02
6	2.0678-02	1.2009+03	1.7993+04	1.1884+03	1.0630+04	2.9874-02
7	2.1718-02	1.2005+03	1.6965+04	1.1888+03	8.0262+03	2.2556-02
8	2.0889-02	1.2005+03	1.7007+04	1.1887+03	8.1009+03	2.2766-02
9	2.6093-02	1.2344+03	1.7340+04	1.2225+03	1.1195+04	3.1648-02
10	2.5590-02	1.2345+03	1.7691+04	1.2223+03	1.1046+04	3.1228-02
11	2.8745-02	1.2344+03	1.7355+04	1.2224+03	1.1047+04	3.1230-02
12	2.5897-02	1.2346+03	1.7743+04	1.2223+03	1.1794+04	3.3341-02
13	2.7634-02	1.2555+03	1.7578+04	1.2434+03	9.1187+03	2.5876-02
14	2.8304-02	1.2558+03	1.8749+04	1.2430+03	1.0964+04	3.1112-02
15	2.6484-02	1.2558+03	1.8824+04	1.2429+03	1.1547+04	3.2769-02
16	2.8183-02	1.2554+03	1.9074+04	1.2423+03	1.1305+04	3.2080-02
17	2.8249-02	1.2550+03	1.7851+04	1.2427+03	9.2368+03	2.6209-02
18	2.9749-02	1.2551+03	1.8321+04	1.2425+03	9.4810+03	2.6902-02

CONDENSING DATA REDUCTION

	424	434	436	440	442	450
	TWI BC	Q/A BC	TWO BC	HCONBC	NUC BC	PSI HD
1	1.1644+03	2.5627+04	1.1464+03	1.1571+04	3.2393-02	3.1089-02
2	1.1645+03	2.5798+04	1.1464+03	1.2195+04	3.4141-02	3.1012-02
3	1.1644+03	2.5481+04	1.1466+03	1.1561+04	3.2367-02	3.1420-02
4	1.1643+03	2.5283+04	1.1466+03	1.0924+04	3.0584-02	3.2010-02
5	1.2009+03	2.3482+04	1.1846+03	1.2467+04	3.5037-02	2.0788-02
6	1.2008+03	2.2819+04	1.1850+03	1.0993+04	3.0897-02	2.1208-02
7	1.2009+03	2.3389+04	1.1847+03	1.1597+04	3.2593-02	2.1111-02
8	1.2008+03	2.3120+04	1.1848+03	1.1052+04	3.1061-02	2.1285-02
9	1.2345+03	2.2738+04	1.2188+03	1.3066+04	3.6938-02	1.6245-02
10	1.2345+03	2.2751+04	1.2188+03	1.2757+04	3.6065-02	1.6507-02
11	1.2346+03	2.3270+04	1.2186+03	1.4851+04	4.1985-02	1.6936-02
12	1.2346+03	2.2897+04	1.2188+03	1.3027+04	3.6828-02	1.6925-02
13	1.2557+03	2.4043+04	1.2393+03	1.3111+04	3.7205-02	1.6634-02
14	1.2559+03	2.4517+04	1.2391+03	1.3451+04	3.8171-02	1.6809-02
15	1.2557+03	2.4062+04	1.2392+03	1.2434+04	3.5284-02	1.6627-02
16	1.2554+03	2.4838+04	1.2384+03	1.3402+04	3.8029-02	1.7314-02
17	1.2553+03	2.4576+04	1.2385+03	1.3476+04	3.8240-02	1.7266-02
18	1.2555+03	2.5138+04	1.2383+03	1.4345+04	4.0704-02	1.7648-02

CONDENSING DATA REDUCTION

	451	452	453	610	611	613
	PI	PO	DPC	PIC	POC	DPCC
1	3.6985+00	3.6492+00	4.9326-02	3.6199+00	3.6636+00	-4.3654-02
2	3.6969+00	3.6497+00	4.7227-02	3.6185+00	3.6641+00	-4.5556-02
3	3.6975+00	3.6508+00	4.6702-02	3.6182+00	3.6651+00	-4.6962-02
4	3.7011+00	3.6502+00	5.0900-02	3.6206+00	3.6646+00	-4.4038-02
5	4.6770+00	4.6327+00	4.4290-02	4.6224+00	4.6500+00	-2.7627-02
6	4.6777+00	4.6380+00	3.9731-02	4.6219+00	4.6552+00	-3.3310-02
7	4.6822+00	4.6373+00	4.4941-02	4.6268+00	4.6546+00	-2.7792-02
8	4.6803+00	4.6360+00	4.4290-02	4.6249+00	4.6533+00	-2.8352-02
9	5.7657+00	5.7307+00	3.4970-02	5.7233+00	5.7502+00	-2.6868-02
10	5.7718+00	5.7315+00	4.0291-02	5.7291+00	5.7510+00	-2.1859-02
11	5.7657+00	5.7292+00	3.6491-02	5.7215+00	5.7487+00	-2.7163-02
12	5.7702+00	5.7345+00	3.5730-02	5.7261+00	5.7540+00	-2.7911-02
13	6.5717+00	6.5339+00	3.7795-02	6.5314+00	6.5550+00	-2.3664-02
14	6.5784+00	6.5398+00	3.8635-02	6.5375+00	6.5609+00	-2.3403-02
15	6.5742+00	6.5364+00	3.7795-02	6.5339+00	6.5576+00	-2.3661-02
16	6.5608+00	6.5222+00	3.8634-02	6.5186+00	6.5433+00	-2.4685-02
17	6.5532+00	6.5188+00	3.4435-02	6.5113+00	6.5399+00	-2.8620-02
18	6.5608+00	6.5213+00	3.9474-02	6.5177+00	6.5425+00	-2.4749-02

CONDENSING DATA REDUCTION

	700	495	701	498	504	507
	X B	WKL B	X T	WKL T	NREF T	NREF B
1	3.8845-01	7.3386+00	7.1948-01	3.3663+00	2.2622+02	4.9332+02
2	3.8947-01	7.3159+00	7.2044-01	3.3500+00	2.2512+02	4.9180+02
3	3.9049-01	7.3514+00	7.2138-01	3.3605+00	2.2583+02	4.9419+02
4	3.8934-01	7.4364+00	7.2028-01	3.4062+00	2.2891+02	4.9991+02
5	3.7269-01	6.8965+00	7.0475-01	3.2459+00	2.2295+02	4.7379+02
6	3.7539-01	6.9354+00	7.0731-01	3.2499+00	2.2323+02	4.7649+02
7	3.7267-01	6.9531+00	7.0473-01	3.2727+00	2.2481+02	4.7771+02
8	3.7303-01	6.9763+00	7.0507-01	3.2817+00	2.2542+02	4.7930+02
9	3.6971-01	6.7644+00	7.0194-01	3.1989+00	2.2421+02	4.7419+02
10	3.6794-01	6.8410+00	7.0024-01	3.2444+00	2.2742+02	4.7958+02
11	3.7048-01	6.8973+00	7.0266-01	3.2578+00	2.2833+02	4.8349+02
12	3.7055-01	6.8967+00	7.0273-01	3.2571+00	2.2830+02	4.8349+02
13	3.6806-01	7.2982+00	7.0034-01	3.4607+00	2.4557+02	5.1795+02
14	3.6794-01	7.3410+00	7.0023-01	3.4817+00	2.4709+02	5.2103+02
15	3.6778-01	7.3012+00	7.0008-01	3.4636+00	2.4579+02	5.1818+02
16	3.6842-01	7.4349+00	7.0069-01	3.5235+00	2.4998+02	5.2755+02
17	3.6980-01	7.4042+00	7.0201-01	3.5012+00	2.4838+02	5.2534+02
18	3.6880-01	7.5012+00	7.0104-01	3.5528+00	2.5206+02	5.3225+02

APPENDIX G

APPENDIX G

Part 1:

Derivation of Two-Phase Condensing Pressure Gradient

The two-phase pressure gradient relation as derived from momentum and continuity relations in Reference 7 is given by Equation 1.

$$\frac{dP}{dl} = \frac{G^2}{g_o}\frac{d}{dl}\left[\frac{(1-x)^2}{\rho_f R_f} + \frac{x^2}{\rho_g R_g}\right] - \frac{4}{D_{eq}}\tau_w - \frac{g}{g_o}\sin\theta\left(\rho_f R_f + \rho_g R_g\right) \quad (1)$$

Neglecting gravity effects, since they can be shown to be negligible, Equation 2 is obtained:

$$\frac{dP}{dl} = \frac{G^2}{g_o}\frac{d}{dl}\left[\frac{(1-x)^2}{\rho_f R_f} + \frac{x^2}{\rho_g R_g}\right] - \frac{4}{D_{eq}}\tau_w \quad (2)$$

where $\beta_f = \beta_g = 1$, i.e., uniform vapor and liquid velocities not necessarily equal. Also from Reference 7, where $\hat{\rho}$ is defined as in Equation 3.

$$\frac{1}{\hat{\rho}} = \frac{(1-x)^2}{\rho_f R_f} + \frac{x^2}{\rho_g R_g} \quad (3)$$

Equation 4 is obtained from Equations 2 and 3:

$$\frac{dP}{dl} = \frac{G^2}{g_o}\frac{d}{dl}\left[\frac{1}{\hat{\rho}}\right] - \frac{4}{D_{eq}}\tau_w \quad (4)$$

If K, the slip ratio is now considered in Equation 3, Equation 5 can be written as in Reference 7:

$$\frac{1}{\hat{\rho}} = \left[\frac{(1-X)K}{\rho_f} + \frac{X}{\rho_g}\right]\left[\frac{1}{K} + X - \frac{X}{K}\right] \tag{5}$$

Integrating Equation (4) from the condenser inlet or X = 1.0 to some arbitrary quality X for a linear axial quality variation, Equation 6 is obtained.

$$P_\ell - P_I = \frac{G^2}{g_o}\left[\left(\frac{1}{\hat{\rho}}\right)_X - \left(\frac{1}{\hat{\rho}}\right)_{X=1.0}\right] - \phi_{1-X}\,\frac{f\ell}{D}\,\frac{G^2}{2\rho_f g_o} \tag{6}$$

Since from Equation 5,

$$\left(\frac{1}{\hat{\rho}}\right)_{X=1.0} = \frac{1}{\rho_g}$$

Equation 7 is obtained from Equation 6.

$$P_\ell - P_I = \frac{G^2}{g_o \rho_f}\left[\frac{\rho_f}{\rho_g} - \frac{\rho_f}{\hat{\rho}_X} - \phi_{1-X}\,\frac{f\ell}{2D}\right] \tag{7}$$

APPENDIX G

Part 2: Derivation of Two-Phase Multiplier for Frictional Pressure Drop for a Homogeneous Model.

For single phase liquid flow, Equation 1 represents the pressure drop relation.

$$\left(\frac{dP}{dl}\right)_0 = \frac{f}{D}\,\frac{G^2}{2g_0\rho_f} \tag{1}$$

If a homogeneous two-phase mixture is assumed, and the density and viscosity are weighted as in Equation 2 and 3 respectively,

$$\frac{1}{\hat{\rho}} = \frac{x}{\rho_g} + \frac{1-x}{\rho_f} \tag{2}$$

$$\frac{1}{\hat{\mu}} = \frac{x}{\mu_g} + \frac{1-x}{\mu_f} \tag{3}$$

the two phase pressure relation is given by Equation 4.

$$\left(\frac{dP}{dl}\right)_{TPF} = \frac{f_{TPF}}{D}\,\frac{G^2}{2g_0\hat{\rho}} \tag{4}$$

or,

$$\frac{\left(\frac{dP}{dl}\right)_{TPF}}{\left(\frac{dP}{dl}\right)_0} = \frac{f_{TPF}}{f}\left(\frac{x\rho_f}{\rho_g} + 1 - x\right) \qquad (5)$$

Expressing f as Equation 6, Equation 7 can be obtained from Equation 5.

$$f = \frac{0.316}{\left(N_{Re}\right)^{0.25}} \qquad (6)$$

$$\frac{\left(\frac{dP}{dl}\right)_{TPF}}{\left(\frac{dP}{dl}\right)_0} = \frac{1 - x + x\frac{\rho_f}{\rho_g}}{\left[1 - x + x\frac{\mu_f}{\mu_g}\right]^{0.25}} \qquad (7)$$

Defining the ratio as the two phase multiplier Ø, the ratio of two-phase to all liquid ΔP is given by Equation 8.

$$\frac{\phi}{x-1} = \int_1^x \frac{1 + x\left(\frac{\rho_f}{\rho_g} - 1\right)}{\left[1 + x\left(\frac{\mu_f}{\mu_g} - 1\right)\right]^{0.25}}\, dx \qquad (8)$$

Integration of this relation gives the following closed form expression:

$$\phi = \left\{\left(\frac{1}{1-x}\right)\left(\frac{1}{\frac{\mu_f}{\mu_g} - 1}\right)^2\right\}\left\{\left(\frac{\frac{\rho_f}{\rho_g} - 1}{1.75}\right)\left(\left[\frac{\mu_f}{\mu_g}\right]^{1.75} - \left[1 + x\left(\frac{\mu_f}{\mu_g} - 1\right)\right]^{1.75}\right) - \left(\frac{\frac{\rho_f}{\rho_g} - \frac{\mu_f}{\mu_g}}{0.75}\right)\left(\left[\frac{\mu_f}{\mu_g}\right]^{0.75} - \left[1 + x\left(\frac{\mu_f}{\mu_g} - 1\right)\right]^{0.75}\right)\right\} \qquad (9)$$

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1. Page 23, paragraph 1, line 1: (0.067-inch hole) should be (0.076-inch hole).

2. Page 210, paragraph 3, lines 4 through 7 should be: loss vs. average sodium to ambient temperature difference ΔT_{Na} is linear on a log-log scale. The resultant equation is

$$QL = 0.67 \left(\frac{\Delta T_{Na}}{1000} \right)^{2.4}$$

where ΔT_{Na} = ^{o}F and QL = Btu/sec.

3. Page 244, equation 1: The quantity (W_K) should be (C_K).